

R E T U R N :

E A S T I N D I A.

(PUBLIC WORKS, INDIA.)

*Ordered, by The House of Commons, to be Printed,
1 August 1851.*

N 56.
EAST INDIA.

RETURN to an Order of the Honourable The House of Commons, dated 10 February 1848;—for,

- A STATEMENT “of the Nature and Locality of all MARITIME SURVEYS undertaken by the East India Company in each Year since 1820; stating those completed or still in progress, and, if discontinued before completion, the Reasons for such discontinuance; with COPIES of CORRESPONDENCE, REPORTS, or other DOCUMENTS, originating in *England* or *India*, connected with such discontinuance; also, Statement of the Measures, if any, hitherto taken to connect the Surveys of the East India Company with each other and with those undertaken by Her Majesty’s Government, and to provide general and accurate CHARTS and SAILING DIRECTIONS for the Indian Ocean, Coasts of India, Red Sea, Persian Gulph, the Indian Archipelago, China and Eastern Seas, with the Rivers, Harbours, Ports and Channels thereof, for facilitating the Navigation of the Vessels carrying on the increasing Commerce of *India*:”
- “ABSTRACT for each Year, since 1820, of the EXPENDITURE in the HYDROGRAPHIC DEPARTMENTS of the East India Company in *England*, and at the different Presidencies of *India*, for all the Maritime Surveys carried on under their Authority, stating under several Heads; namely, the Number and Rank of the Officers employed, and their extra Pay and Allowances; the Number of Men, and the Charge for Wages, Provisions and Allowances, if any, distinguishing for Officers and Men the Amount: Also, a RETURN of the Number, Class, Description, and Size of SURVEYING VESSELS under each Presidency, and the Numbers and Ranks of Officers and Men so employed in each of such Vessels, with the Total Annual Charge of each Vessel, in each Year; also the Amount for Office Expenses, for Surveying Instruments, and other Surveying Materials, for Charts and Sailing Directions, so as to exhibit the whole Expense incurred by the East India Company, in each of those Years, under that Department:”
- “RETURN of the HYDROGRAPHIC DEPARTMENTS of the East India Company existing at present in *England*, and at the several Presidencies of *India*, stating the Number, Rank, and Pay of the Officers and others Employed, and the Expense of these Establishments at each such place; also, stating under what Superintendence each of the several Departments are placed:”
- “List, Description, Dates of Execution and Publication of all CHARTS and SAILING DIRECTIONS; the Scale of the Charts, and their Size:”
- “Also, a List of all SAILING DIRECTIONS, of MEMOIRS, or other Materials for CHARTS or Sailing Directions in the East India Company’s Establishments in *England* and in *India*, distinguishing those Published and Unpublished, stating also the Reasons, if any, which prevent the Unpublished Materials from being Published:”
- “RETURN of the PRICES at which those Charts and Sailing Directions published by or under the direction of the East India Company are severally Sold, and the Names of the Agents and Places in *England* and *India* where Sold; stating also, the Allowances made to Parties selling the same: also what Supply, if any, is kept in *India*, and what Means, if any, are taken to make the same available to the Public:”
- “And, Statements of any Special GRANTS of MONEY made by the East India Company, in each Year since 1820, to Officers in their service for Surveys; and also of all Payments to Individuals to assist them in preparing and publishing Surveys, Charts, and Sailing Directions for the Indian Ocean, Coasts of India, Red Sea, Persian Gulph, Indian Archipelago, China and Eastern Seas, and of the Measures which have been adopted by the East India Company to render the great Triangulation of the Survey of *India* available for establishing Points on the Coast of *India* for connecting and correcting the Maritime Surveys heretofore made, and for facilitating the carrying on of Surveys.”
- LIST “of all LIGHTHOUSES, FLOATING LIGHTS, BEACONS, BUOYS, or other LAND or SEA MARKS, established by the East India Company, or by any other parties, in any parts of the Indian Ocean, on the Coasts of India, the Red Sea, Persian Gulph, Indian Archipelago, China, and Eastern Seas, with a Description of the Nature of such Light, the Cost of Erection, and the Means adopted for their Maintenance: Also, a Statement of all Applications for erecting LIGHTHOUSES and BEACONS, and for laying down BUOYS and SEA-MARKS for facilitating the Navigation of those Seas, made to the Governments of *India* and at Home, and whether allowed or not, and the Results thereof:”
- “Statement of the Arrangements and Measures made by the East India Company, or in progress, with the view of Surveying and Providing LIGHTS for the Coasts above described, and for facilitating, surveying, improving, and making known to the Shipping the entrance into the Rivers and Harbours, Ports and Channels on the Coasts of *India*:”
- “And also, REPORT from the Commodore Superintendent of the Indian Navy of the Measures required to make the Surveys, Charts, and Sailing Directions for the Seas and Coasts within the limits of the East India Company’s Charter generally available for the use of the Indian Navy and the Mercantile Marine: Also, what Measures are required to bring the Surveys, Charts, and Sailing Directions hitherto made by the East India Company in connection with each other, and in connection with and to correspond in uniformity of Scale and other particulars with those made in the Indian Ocean, China and Eastern Seas, by or under the Admiralty of Great Britain: Also, stating, in regard to the same Seas and Coasts, what Establishments of Officers and Men, the Size and Descriptions of Vessels, and what other measures are necessary to re-survey or determine doubtful Positions, to verify existing Charts, to correct known or admitted Errors, to make Surveys of un-surveyed Positions, and to replace obsolete Charts and Sailing Directions.”

East India House, }
12 June 1851. }

JAMES C. MELVILL.

(Mr. Hume.)

Ordered, by The House of Commons, to be Printed,
6 August 1851.

L I S T.

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STATEMENT of the NATURE and LOCALITY of the MARITIME SURVEYS
undertaken by the EAST INDIA COMPANY, since the Year 1820, and other
Papers connected with that Subject.

From Captain *T. E. Rogers*, Superintendent of Marine, to Major-General the
Honourable Sir *John Hunter Littler*, G.C.B., Deputy Governor of Bengal,
dated 23 August 1850.

Honourable Sir,

I HAVE at length the honour to submit herewith the returns to the orders of the Honourable the House of Commons, forwarded to me with Mr. Under-Secretary W. Seton Karr's letter, No. 344, of the 1st May 1848. I regret very much the great delay that has occurred in the preparation of these statements, but it has been entirely unavoidable. The demands on the secretary and the regular current business of this office, and the preparations of the numerous returns of various kinds required of late years from this department, render it extremely difficult to furnish such statements as those referred to, and especially when the information required spreads over a period of nearly 30 years, and it is necessary therefore to search the records of the department for so many years, and when, moreover, in going back so far, they are found to be very imperfect. As it is, without the aid of the clerk in charge of the "Pluto," the delay would have been still greater. An attempt was made at first to cast the whole information, various as it is, into one tabular statement; but after some progress had been made in this attempt, with the aid of Mr. Weston, the naval storekeeper then unemployed, it was found necessary to abandon it and commence again on a new plan, that of separating the information into several distinct statements for each Order of the House.

Both the Orders of the Honourable House, your Honour will observe, bear date the same day, nor is there any indication upon them of the order in which they were issued, or were required to be replied to; I take them according to their positions as they were forwarded to me; I may observe too that the tenor of both is so similar, that at a first glance the one might almost be taken to be a duplicate of the other. Both relate to surveys. The distinction appears to be, that the first, according to the order in which they have reached me, includes the mention of lights and buoys.

The returns to both Orders are comprised in the statements of which a list is annexed. Those that contain the information called for in the first Order relating to lights and buoys are numbered from 1 to 6, and I believe they will be found to furnish all that is required by the Order, or that can be of any use in elucidation of the subject of inquiry. It is proper to remark, that much of the information contained in these answers to the first Order of the House of Commons is a repetition of that already supplied in the answers to the printed questions of the Admiralty, which were received some time after the Orders of the House reached me, but admitted of readier reply from the form in which the information required was asked for, the distinct and specific character of the questions, and the most limited range of the inquiry. All but the first paragraphs of this first Order belong to the Commodore Superintendent of the Indian Navy to answer.

The statements that supply the answer to the second Order of the Honourable House, relating to maritime surveys, charts, and sailing directions, are lettered
659. A 2 for

for distinction from (A.) to (D.), and contain, I believe, all that is required in the Order, in so far as the records of this department enable me to furnish the information.

In the first Order of the House no period for which the returns are required is specified, but in the second 1820 is mentioned. I have gone back to that date in the statements, supplying the answers to both returns, except Statement No. 5, which the records in respect to buoys do not enable me to carry further back than the year 1828.

Sailing directions for the Sand Heads. Ditto - ditto - for Akyab Harbour. Ditto - ditto - from the south-west coast of Cheduba to Foul Island.	With regard to sailing directions, in the cases of most of the surveys executed under this Presidency within the periods included by the returns, the directions are those noted in the margin, copies of which are forwarded herewith.
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In the first paragraph of the second Order, information is required as to what measures are adopted to connect the surveys of the East India Company with each other, or with those of Her Majesty's Government. Nothing of the kind is done at this Presidency, for the hydrographical department was abolished many years ago. This fact furnishes a sufficient answer, as far as this Presidency is concerned, to the third paragraph of the second Order, calling for a return of the hydrographical departments in India.

" 5. Return of the prices at which these charts and sailing directions, published by or under the direction of the East India Company, are severally sold, and the names of the agents and places in England and India where sold, stating also the allowances made to parties selling the same. Also what supply, if any, is kept in India, and what means, if any, are taken to make the same available to the public."	The information called for in the paragraph of the second Order of the Honourable House, as quoted in the margin, may be given here. All the charts executed under the auspices of the Honourable Company are published by Messrs. Allen & Co., of Leadenhall-street, and a list of them is contained in the printed pamphlet submitted herewith, as sent out by the Honourable Court. The pamphlet also shows their prices. The charts of all surveys executed here are transmitted through Government to the Honourable Court, and when these are published, copies are sent out by that authority to this Presidency, chiefly for the use of this department. In some cases many more are received than are required by our own vessels. The charts of surveys of the Sand Heads are also lithographed in this country, a large number of copies being struck off. In regard to these and all charts of which there are spare copies, these are supplied when required to commanders of merchant vessels, at an advance of 30 per cent. on prime cost. The prices of charts published at home are, as stated above, shown in the printed pamphlet referred to, and 30 per cent. is added to those prices. The charts of the Sand Heads lithographed here, which are sent by this department to the collector of Government customs for sale, are sold at two rupees a copy. I am not aware that the Honourable Court have any agencies in India for the sale of charts, and consequently no allowance is made to any one for selling them. It is not considered fair to come into competition with private vendors of charts, and none are supplied to any but the Government vessels, except when they are not procurable elsewhere.
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I am unable to state, as required in the concluding passage of the second Order of the House of Commons, to what extent the great trigonometrical survey of India has been rendered "available for establishing points on the coast of India, for connecting and correcting the maritime surveys heretofore made, and for facilitating the carrying on of surveys;" but, as regards the coasts and islands of the Bay of Bengal from the Sand Heads down to the southern promontory of Ceylon on the western side, and down along the shores of Chittagong, Arracan, and Tenasserim to Junk Ceylon, with the isles and islets facing the last-named coast, and the Andaman archipelago, I believe that the geographical position of every important point has been correctly ascertained and laid down.

Your Honor will easily conceive that the difficulty of furnishing full and correct information relative to surveys and charts has been greatly enhanced by the

the want of a hydrographical department here, that which once existed having been abolished, as stated above, to collect and record all the statistics and other details of hydrographical researches.

It is not in my power to say anything to what is already stated herein that would throw any further light on the subject of lights or surveys. I have to express my regret that I have not yet received the chart of Lieutenant Fell's survey of the Coromandel Coast, finished in 1848, from the Patient Shoal to Bimlipatam and the Santapilly Rocks. He has explained that it has been delayed by his having accidentally mislaid one of his books of angles. I expect to receive it soon, and also the chart of his survey of the Pegue Coast, extending from Cape Negrais eastward to the entrance of the Situng River. Both will be submitted for transmission to the Honourable the Court as soon as they are received.

I am, &c.

Fort William,
Marine Superintendent's Office,
23 August 1850.

(signed) *T. E. Rogers,*
Superintendent.

(No. 488.)

COPY of this letter, with the statements in original therewith received, forwarded to the Home Department of the Government of India, with reference to the letter from the department No. 384, dated 15 April 1848.

By Order of the Honourable the Deputy-Governor of Bengal.

Fort William, 28 August 1848.

(signed) *W. Seton Karr,*
Under Secretary to the Government
of Bengal.

LIST of STATEMENTS furnishing the Information called for in two Orders of the Honourable The House of Commons, dated 10 February 1848.

FIRST ORDER, relating to LIGHTS, BUOYS, and MOORINGS.

No. 1. Lighthouses in existence.

No. 2. Floating Lights in existence.

No. 3. Lights proposed but not carried out.

No. 4. Lights abandoned.

No. 5. Channel buoys proposed or recommended by different officers, and of those mentioned by the Bengal Government during the official years from 1820-21 to 1848-49.

No. 6. Statement showing the expense incurred for Channel Buoys by the Bengal Government from the official years 1828-29 to 1848-49, including the construction, repairing and other charges under that head.

SECOND ORDER, relating to MARITIME SURVEYS, CHARTS, AND SAILING DIRECTIONS.

(A.) Surveys proposed, commenced, completed or rejected, also those in progress, 1820-29.

(B.) List of Rank and Pay Officers employed in Marine Surveys between the official years 1820-21 and 1848-49.

(C.) Statement of all Charges incurred on account of Surveys executed under the Bengal Presidency, from the year 1821-22 to the year 1849-50.

(D.) List of Charts in the office of the Superintendent of Marine, of all Surveys that have been executed between the official years from 1820-21 and 1848-49, under the orders of the Bengal Government.

(signed) *J. Sutherland*, Secretary.

Fort William, Superintendent's Office,
23 August 1850.

(A.)

SURVEYS Proposed, Commenced, Completed, or Rejected; also, those in Progress.

Year.	Names of Surveys.	When Proposed or Ordered.	When Commenced	Period during which the Work was Carried on.	Names of Vessels Employed.	Names of Officers Employed.	When Completed or Discontinued.	REMARKS.
1820	- - A bank reported by the commander of the ship "Bulwer" (Bay of Bengal.)	1820	1820	1820-21	- - Hon. Co.'s ship "Near-chus."	Lieutenant Maxfield, I.N.	Discontinued 1821.	- - Lieutenant Maxfield forwarded a manuscript chart of the track of the "Near-chus" while engaged in the survey, which however did not lead to the discovery of the bank. A manuscript chart completed.
1820	London Shoal - - -	1820	1820	- - -	- - Hon. Co.'s ship "Near-chus."	Lieutenant Maxfield, I.N.	Completed 1821.	
1820	- - Coast between Kanaka and Balasore Rivers.	1820	1820	1820-21	- - Hon. Co.'s pilot vessels, "Hatrass" and "Asseer-ghur."	- - Commander Court of the Bombay Marine.	1820	
1820	- - Bale of Cotton Rock, Bay of Bengal.	1820	1820	1820 to 1822	- - Hon. Co.'s pilot vessel "Henry Meriton," and Hon. Co.'s ship "Near-chus."	Mr. Branch Pilot Sinclair Lieutenant Maxfield, I.N.	Discontinued in 1822.	- - Three several attempts were made to discover this rock, but without success.
1820	- - An anchoring bank, about 15° 10' north and 83° 50' east.	1820	1820	1820	- Hon. Co.'s pilot vessel "Henry Meriton."	Mr. Master Pilot Sinclair	1820	- - The first expedition in search of the Bale of Cotton Rock, also included a search for this bank, but with like want of success.
1821	The Chittagong River -	Previous to 1820.	Previous to 1820.	- - -	- - Hon. Co.'s cruiser "Minto."	Lieutenant Criddle, B.M.	Finished 1821	No chart extant.
1821	The Coromandel Coast -	Previous to 1820.	Previous to 1820.	1821, 1822, 1823, 1824. 1840-1845 1846, 1847	Hon. Co.'s ship "Near-chus." Hon. Co.'s surveying vessel "Krishna."	Lieutenant Maxfield, B.M. Captain Lloyd, I.N. Lieutenant Fell, I.N.	- - -	- - Different portions of the Coromandel coast have been surveyed at different periods. A survey was commenced in 1821, and finished the next year, of the space between the Armagon Shoal and the mainland, or Blackwood's Harbour, as it was called, after Sir Henry Blackwood, R.N. The year following, however, there was a re-survey, and the brig "Mary Anne" kept riding in the harbour during the north-east monsoon, with a view of ascertaining if vessels could ride in it at that season of the year with safety. In 1824 a measurement survey of the harbour was also completed. In 1845-46 a survey of the coast was made by Lieutenant Fell, from Santapilly Rocks to Pulicat, as also other portions of the coast to the northward as far as the Armagon Shoal. Next was a survey of Coringa Harbour. The portion of the coast between Armagon Point to the north of Preman River was then surveyed. A partial survey of Mootapilly Shoals was likewise executed; and immediately after the surveys of the Pulicat and Armagon Shoals to Ponde Point, and from Ennore to Armagon Hill. In 1847 the survey of the coast from Masulipatam to Coringa Bay was completed; the surveys of the coast to the southward of Vizagapatam was in progress; and that from the Santapilly Rocks to Pulicat finally completed. Lieutenant Fell is now engaged in the preparation of a complete chart of his whole survey of the coast from Pulicat Shoal to Bimlipatam and the Santapilly Rocks.

(A.)—SURVEYS Proposed, Commenced, Completed, or Rejected; also, those in Progress—*continued*.

Year.	Names of Surveys.	When Proposed or Ordered.	When Commenced.	Period during which the Work was Carried on.	Names of Vessels Employed.	Names of Officers Employed.	When Completed or Discontinued.	REMARKS.
1821	- - A bank seen in the Bay of Bengal in the track to Madras, 28° 32' 30" north, 91° 43' east.	1821	1821	1821-1822	- - Hon. Co.'s cruiser "Minto," and Hon. Co.'s pilot vessel "Sophia."	Lieutenant Maxfield, I. N.	Completed in 1822.	Search unsuccessful.
1821	- - La Mameme's Reef in the Bay of Bengal.	1821	1821	1821-1822	- - Hon. Co.'s ship "Near-chus."	- - Captain Ross, I. N. Marine Surveyor-general.	Discontinued in 1822.	The search for the reef was unsuccessful.
1821	- - An island supposed to have been seen between 1° 5' 30" north, and 88° 95' east.	1821	1821	1821-1822	- - Hon. Co.'s ship "Near-chus."	- - Captain D. Ross, I. N. Marine Surveyor-general.	Discontinued in 1822.	Search unsuccessful.
1821	- - A shoal at the head of Bay of Bengal, 20° 31' north, 91° 40' 30" east.	1821	1821	1821-1822	- - Hon. Co.'s surveying vessel "Minto."	Lieutenant Criddle, B. M.	Completed 1822.	- - The survey was undertaken in consequence of a report made by Captain Allput of the ship "Edward Strettle;" but the result proved that the shoal was no other than the one laid down in Lacam's Chart of the Bay of Bengal as the North Patch.
1823	River Naaf in Arracan	1823	1823	1823	- - - - -	Mr. Branch Pilot Chew	Completed in 1823.	- - Mr. Chew, as the result of his survey, reported favourably on the river as a navigable stream.
1823	- - The Coast of Tenasserim and the islands off it.	1823	1823	1823-1824 1825-1826 1827 1831-1839	Hon. Co.'s ship "Research." Hon. Co.'s ship "Investigator." Hon. Co.'s schooner "Freak." Hon. Co.'s pilot vessel "Lady Wm. Bentinck."	- - - - - Captain D. Ross, I. N. - - - - - - Captain R. Lloyd, I. N. -	1839	- - The survey of the Coast of Tenasserim was not executed at one time or systematically, but various portions of it, together with the islands off the coast, were undertaken at different intervals. In 1823 the survey of the Mergui Archipelago off Tenasserim was recommended and commenced. The survey was partially finished in 1827, from latitude 7° north to Tavoy Island. In 1828 the coast from Amherst to Mergui was surveyed, and in 1831 the Mergui Islands was completed. Simultaneously a survey more in detail than that executed by Captain Ross was ordered, but the following year the order was suspended. In 1839, however, the islands off the Tenasserim Provinces and the coast itself were surveyed by Captain Lloyd in the "Lady William Bentinck," to the full extent considered necessary.

-- This survey was undertaken in 1825. In 1827, the coast from Chittagong to south of Cheduba was finished, but in 1828 the survey was suspended, to enable the surveying officers to examine other parts, considered of more urgency and importance. At this time the work had advanced from latitude 17° to Cape Negrais in 15° 40'. In 1831 the survey was resumed, and during the following two years the survey included the sub-joined portions of the coast and channels, viz. Kyauk, Phyou Harbour, Arracan River, Combermere Bay, and Channel Anchorage to the eastward of Ramree and Juggoo, &c. A chart of this survey was supplied and published in 1833. These surveys were conducted by Captains Ross and Lloyd; the former left the Arracan Coast about the middle of the year 1833, leaving Captain Lloyd to finish Combermere Bay and the inland navigation in the approaches to Aeng and the Talach. Latterly, Captain Lloyd had a little vessel, called the "Sophia," and officers were supplied from the pilot service to assist in the survey. In 1834 the survey was suspended.

-- The survey of the coast was extended from Martaban to Tavoy, including an examination of the northern and southern channels of the Island of Pulo Gheun leading to Amherst Town, with a view also of finding a harbour of refuge for vessels, and a suitable place for landing cargo. This work was carried on up to 1828, when it was discontinued, but resumed in 1846, when Lieutenant Fell, in the "Krishna," surveyed Amherst northward round Pellew Gheun and the coast as far as the Sittang River.

A chart was forwarded by the surveyor.

1825	The Coast of Arracan	-	1825	1825	1825-1826	Hon. Co.'s ship "Investigator," Hon. Co.'s schooner "Freak."	-	-	-	-	-	-
					1827-1828	Hon. Co.'s ship "Research."	Captain D. Ross, I. N.	-	-	-	-	-
					1831	Hon. Co.'s private vessel "Guide," Hon. Co.'s pilot vessel "Flora."	-	-	-	-	-	-
					1833	Hon. Co.'s pilot vessel "Sophia."	Captain R. Lloyd, I. N.	-	-	-	-	-
1825	The Coast of Martaban	-	1825	1825	1825	Hon. Co.'s ship "Research"	-	-	-	-	-	-
					1828	Hon. Co.'s ship "Investigator."	Captain D. Ross, I. N.	-	-	-	-	-
					1846	Hon. Co.'s ship "Satellite"	-	-	-	-	-	-
					1847	-	-	-	-	-	-	-
1826	Rangoon River	-	1826	1826	1826	Hon. Co.'s ship "Research," Hon. Co.'s ship "Investigator."	Captain D. Ross, I. N.	-	-	-	-	-

(A.)—SURVEYS Proposed, Commenced, Completed, or Rejected; also, those in Progress—*continued*.

Year.	Names of Surveys.	When Proposed or Ordered.	When Commenced.	Period during which the Work was Carried on.	Names of Vessels Employed.	Names of Officers Employed.	When Completed or Discontinued.	REMARKS.
1827	Martaban River - - -	1827	1827	1827	- - Vessels of the flotilla engaged in the Rangoon expedition.	Officers of the flotilla -	1827	- - This survey was executed under the immediate orders of Sir A. Campbell, Commander-in-Chief of the expedition against the Burmese.
1828	Chittagong River - - -	1828	1828	1828	- - Hon. Co.'s pilot vessel "Mermaid."	- - Mr. Branch Pilot W. Sinclair.	1829	This was a re-survey of the river.
1836	- - Sea face of the Soonderbunds.	1836	1836	1836-37-38	- - Hon. Co.'s pilot vessel "Lady Wm. Bentinck."	Captain R. Lloyd, I. N. -	1840	- - In 1839 the survey was carried as far as the Megna, and in 1840 to Chittagong, when the Government being of opinion that the work had been done as far as was necessary for the practical purposes of navigation, the survey was discontinued.
1843	- - Bank observed by H. M. ship "Thalia," western entrance North Prepara Channel.	1843	1843	1843	Not traced.	Not traced - - -	1843	- - This was discovered, and is entered in the charts as the Thalia Reef.
1843	- - Island said to have been observed south-east of Cheduba.	1843	1843	1843	- - Hon. Co.'s steamer "Ganges."	Captain J. Russell -	1843	Not found.
1847	- - Alguada Reef and the shoals between Cape Negrais and Prepara.	1847	1848	1847-48	- - Hon. Co.'s surveying vessel "Krishna."	Lieutenant W. Fell, I. N.	1848	- - This reef and the shoals between Cape Negrais and Prepara Island were surveyed by Lieutenant Fell, I. N., in 1848, as well as the channel between Diamond Island and Alguadas Reef, and a chart was furnished and has been transmitted to England.
1849	- - Coast and sands off the Coast of Pegue between latitude 15° 20' and 15° 55' north, and longitude 94° and 95° 55' east.	1849	1849	1849	- - Hon. Co.'s surveying vessel "Krishna," and the schooner "Spy."	Lieutenant W. Fell, I. N.	1849	Chart not yet received.

Fort William, Marine Superintendent's Office, }
23 August 1850.*James Sutherland, Secretary.*

STATEMENT of the Measures taken to connect the SURVEYS of the East India Company with each other, and with those undertaken by Her Majesty's Government, and to provide general and accurate CHARTS and SAILING DIRECTIONS for the Indian Ocean, Coasts of India, Red Sea, Persian Gulph, the Indian Archipelago, China and Eastern Seas, with the Rivers, Harbours, Ports and Channels thereof, for facilitating the Navigation of the Vessels carrying on the increasing Commerce of *India*.

THE Governments in India keep constantly in view the necessity of connecting the surveys made in the Indian Seas. Up to the present time the surveys of the entire line of coast extending from Ras Haffoon, on the north-east coast of Africa, to Goa, on the coast of Malabar, has been connected. Surveyors are at present engaged in filling up the unsurveyed portions to the southward of Goa. The East India Company's charts of the west coast of Ceylon have been connected both as regards arrangement and scale with those of Her Majesty's Government on the south and east coast of that island. Captain Horsburgh, the late hydrographer to the Company, compiled a set of general charts by order of the Court of Directors, in which the coasts of India, Red Sea, Persian Gulf, Indian Archipelago, China and Eastern Seas were embraced. These, as well as the East India Company's particular charts, are kept in a corrected state by their present geographer. Sailing directions for the Red Sea, the Maldeeve Islands and Chagos Archipelago have been printed by their orders, but the sailing directions for the Indian Seas, originally published by the late Captain Horsburgh, and since his death continued to be edited by Captain Miles, R.N., are so full and complete for present purposes, that it has not been deemed necessary to compile another book of directions for those seas.

John Walker.

East India House, May 1851.

EXPENDITURE of the Hydrographic Department of the East India Company in *England*, in the following Years, viz.:—

Years.											£.
1820	Salaries of Hydrographer and his assistant	-	-	-	-	-	-	-	-	-	900
1821	Ditto	-	-	-	-	ditto	-	-	-	-	920
1822	Ditto	-	-	-	-	ditto	-	-	-	-	940
1823	Ditto	-	-	-	-	ditto	-	-	-	-	960
1824	Ditto	-	-	-	-	ditto	-	-	-	-	980
1825	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1826	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1827	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1828	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1829	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1830	Ditto	-	-	-	-	ditto	-	-	-	-	1,000
1831	Ditto	-	-	-	-	ditto	-	-	-	-	550
1832	Ditto	-	-	-	-	(office of assistant abolished)	-	-	-	-	400
1833	Ditto	-	-	-	-	-	-	-	-	-	400
1834	Ditto	-	-	-	-	-	-	-	-	-	400
1835	Ditto	-	-	-	-	-	-	-	-	-	400
1836	Ditto	-	-	-	-	-	-	-	-	£.200	
	Salary of Geographer	-	-	-	-	-	-	-	-	50	250
1837	Ditto	-	-	-	-	-	-	-	-	-	100
1838	Ditto	-	-	-	-	(including charge for keeping the marine charts in a complete state according to the latest authorities.)	-	-	-	-	200
1839	Ditto	-	-	-	-	ditto	-	-	-	-	200
1840	Ditto	-	-	-	-	ditto	-	-	-	-	300
1841	Ditto	-	-	-	-	ditto	-	-	-	-	300
1842	Ditto	-	-	-	-	ditto	-	-	-	-	300
1843	Ditto	-	-	-	-	ditto	-	-	-	-	300
1844	Ditto	-	-	-	-	ditto	-	-	-	-	300
1845	Ditto	-	-	-	-	ditto	-	-	-	-	300
1846	Ditto	-	-	-	-	ditto	-	-	-	-	300
1847	Ditto	-	-	-	-	ditto	-	-	-	-	300
1848	Ditto	-	-	-	-	ditto	-	-	-	-	300
1849	Ditto	-	-	-	-	ditto	-	-	-	-	300
1850	Ditto	-	-	-	-	ditto	-	-	-	-	300

East India House, }
26 May 1851. }

James C. Melvill.

(B.)

LIST of RANK and PAY of OFFICERS employed in Marine Surveys between the Official Years
1820-21 to 1848-49.

NAMES.	RANK.	MONTHLY PAY.	REMARKS.
		<i>Rs. as. p.</i>	
Squire, E. B. - - -	2d Lieutenant B.M. -	70 - -	
Nott, A. H. - - -	" " " -	70 - -	
Ross, Daniel - - -	Captain " -	240 - -	
" " - - -	" " -	602 - -	- - As Junior Captain ashore.
" " - - -	" " -	540 - -	- - As Senior Captain afloat.
Minchin, George -	1st Lieutenant -	221 - -	
" Williams, A.'S. -	Captain I. N. -	400 - -	
" Williams, A.'S. -	2d Lieutenant I. N. -	70 - -	
Crawford, John -	Junior Captain I. N. -	180 - -	
Harrison, G. B. -	2d Lieutenant I. N. -	70 - -	
" " - - -	1st " (acting) I. N. -	110 - -	
Montrieu, Charles -	Midshipman I. N. -	30 - -	
" " - - -	Lieutenant I. N. -	120 - -	- - Sicca or Company's Rs. 125. 6. 5.
" " - - -	" " -	150 - -	
Williams, A. S. -	Lieutenant I. N. (2d acting 1st.) -	110 - -	
Laughton, G. -	1st Lieutenant I. N. -	250 - -	
Boscawen, George -	2d Lieutenant I. N. -	200 - -	
" " - - -	Lieutenant I. N. -	300 - -	
" " - - -	" " -	120 - -	
Lloyd, R. - - -	1st Lieutenant I. N. -	110 - -	
" " - - -	" " -	150 - -	
" " - - -	Captain I. N. -	300 - -	- - Sicca or Company's Rs. 313. 8.
Chalke, J. H. - - -	- - - -	- - -	
Gulson, Joseph - -	- - - -	- - -	
Shum, W. J. - - -	Midshipman I. N. -	50 - -	
" " - - -	" " -	100 - -	- - As 1st Officer of "Eagle" tender.
Rennie, J. - - -	" " -	50 - -	
" " - - -	" Acting Lieut. -	145 - -	
Prentice, T. - - -	Lieutenant I. N. -	145 - -	- - Reduced in 1838 to 120 rupees.
Fell, William - - -	Midshipman I. N. -	50 - -	
" (acting) - - -	Lieutenant I. N. -	145 - -	
" - - -	2d Lieutenant I. N. -	90 - -	
" - - -	1st Lieutenant I. N. -	120 - -	
" - - -	Commanding Lieut. I. N. -	550 - -	} Includes allowances.
" - - -	" " -	650 - -	
Young, E. G. C. - -	Senior Lieutenant I. N. -	150 - -	
Young, J. W. - - -	Lieutenant I. N. -	145 - -	
Jones, N. J. - - -	2d Officer I. N. -	90 - -	
Cantor, T. E. - - -	Surgeon, uncovenanted -	250 - -	
Beaumont, C. A. - -	Mate - - -	90 - -	
Pollard, John - - -	Midshipman I. N. -	60 - -	
Cearns, Charles - -	" " -	60 - -	
Williams, R. - - -	Clerk, uncovenanted -	50 - -	
Johnston, Edward -	Midshipman -	50 - -	
Inman - - -	" " -	50 - -	
Rennie, J. - - -	2d Officer I. N. -	90 - -	
" " - - -	Lieut. I. N. 2d Officer -	120 - -	
Keymer - - -	Mate - - -	90 - -	
Powell - - -	Midshipman -	50 - -	
Eckley - - -	" " -	50 - -	
" " - - -	" " -	30 - -	
Buxter - - -	" " -	50 - -	
Thomson, George - -	Surgeon - - -	250 - -	
Perry, W. C. - - -	Midshipman -	60 - -	
" " - - -	Mate - - -	90 - -	
Owen, J. - - -	Midshipman -	60 - -	
Weston, H. B. - - -	1st Officer, uncov. -	120 - -	
" " - - -	In command -	300 - -	
Parker, A. - - -	Mate - - -	90 - -	

NAMES.	RANK.	MONTHLY PAY.	REMARKS.
		<i>Rs. as. p.</i>	
Cearns, W. - - -	2d Mate - - -	90 - -	
Bull, J. G. - - -	Midshipman - - -	50 - -	
Auld, S. J. - - -	Mate - - -	90 - -	
Owen, J. - - -	Midshipman - - -	50 - -	
Vigey - - -	" - - -	50 - -	
Robertson, A. - - -	Surgeon, uncovenanted	250 - -	
Smith, T. W. - - -	2d Officer - - -	90 - -	
Warden, C. W. - - -	Mate - - -	90 - -	
Young, Charles - - -	Midshipman - - -	50 - -	
Kellens - - -	Mate - - -	90 - -	
Griffiths - - -	Midshipman - - -	40 - -	
Rivett - - -	Officer - - -	100 - -	- - "Eagle."
Crawley, L. - - -	Midshipman - - -	50 - -	
Coverly, Samuel - - -	1st Officer, uncov. - - -	120 - -	
Swan - - -	2d " - - -	90 - -	
Barlow, F. - - -	Mate, Pilot service - - -	- - -	
Haggan - - -	Midshipman, Pilot service. - - -	- - -	
Bull - - -	Midshipman, uncov. - - -	50 - -	
Maxton - - -	Surgeon " - - -	250 - -	
Robson - - -	Commanding, Pilot service. - - -	- - -	
Scallan, T. - - -	Mate, Pilot service - - -	130 - -	
Power, T. E. - - -	1st Officer - - -	120 - -	
Bedford, A. - - -	2d " - - -	120 - -	
Clark, W. - - -	2d " - - -	120 - -	
Ross, R. S. - - -	2d " uncovenanted - - -	120 - -	
Parker, C. - - -	2d " - - -	90 - -	
Gatfield, H. - - -	3d " - - -	90 - -	
Shield - - -	3d " - - -	90 - -	
Williams, R. - - -	Clerk - - -	50 - -	
Knight - - -	2d Officer - - -	90 - -	
" - - -	1st " - - -	120 - -	
Dilber - - -	1st " - - -	120 - -	
Harrison - - -	2d " - - -	90 - -	
Keymer - - -	Mate - - -	90 - -	
Porter - - -	Midshipman - - -	60 - -	
" - - -	" - - -	50 - -	
Gomey - - -	" - - -	30 - -	
Warson, E. H. - - -	Surgeon, uncovenanted	250 - -	
Llewelyn, W. T. - - -	1st Officer - - -	150 - -	
M'Donald, J. - - -	2d " - - -	100 - -	
Brooming - - -	3d " - - -	70 - -	
Ravenscroft - - -	Clerk - - -	50 - -	
Maudell, J. - - -	Surgeon, uncovenanted	250 - -	
Adams, G. F. - - -	1st Officer " - - -	150 - -	
Eales, C. - - -	2d " " - - -	100 - -	
" - - -	2d " " - - -	115 - -	
Stables, S. W. - - -	3d " " - - -	70 - -	
Hodge, T. - - -	1st " " - - -	135 - -	
Campbell, N. - - -	Surgeon, uncovenanted	250 - -	
Fell, R. B. - - -	3d Officer " - - -	70 - -	
" - - -	2d " " - - -	100 - -	
Shephard, J. - - -	1st " " - - -	135 - -	
Spiers, R. - - -	Surgeon " - - -	250 - -	
Mayers - - -	3d Officer " - - -	70 - -	
Fryer, A. - - -	Commanding " - - -	300 - -	
Mansfield, W. - - -	1st Officer " - - -	100 - -	

Fort William,
Marine Superintendent's Office, }
23 August 1850.

James Sutherland, Secretary.

[illegible]

(continued)

(C.)—STATEMENT of all Charges incurred on account of Surveys executed under the Bengal Presidency, &c.—continued.

Names of Vessels.	Class or Tonnage.	Names of Officers.	POSITION.	RANK.	Allowance.	Total Pay of Officers and Crew.	Expense of Provisions, Stores, and Contingencies.	Total Annual Expense.	TOTAL.	REMARKS.
Year 1830 and 1831:		Ross	Surveyor	Captain	Rs. 10,725	-	-	Rs. 10,725	Co.'s Rs. as p.	Contingencies. " " -- Pay and provisions included in one sum. 47,666 4 -
		Montrion	Draftsman	Midshipman	1,200	-	-	1,200	-	
		Lloyd	1st Assistant Surveyor	Captain	1,050	-	-	1,050	-	
Eliza	-	-	-	-	-	-	4,475 1 4	4,475 1 4	-	
Research	-	-	-	-	-	-	389 3 9	389 3 9	-	
Trusty	-	-	-	-	-	-	18 10 -	18 10 -	-	-- Pay and provisions included in one sum. 24,302 2 5
Freak	-	-	-	-	-	-	830 2 6	5,506 2 6	-	
Year 1831 and 1832:		Ross	Surveyor	Captain	Rs. 10,650	-	-	10,650	-	-- Arrears of pay and provision money. 32,778 4 11
		Lloyd	1st Assistant Surveyor	"	4,200	-	-	4,200	-	
		Montrion	Draftsman	Midshipman	1,080	-	-	1,080	-	
Eliza	-	-	-	-	-	-	5,397 6 11	5,397 6 11	-	
Guide	-	-	-	-	-	-	4 14 -	1,640 -	-	
Flora	-	-	-	-	-	-	-	5,600 14 -	-	Office rent, stores, &c. &c. 21,030 4 7
Year 1832 and 1833:		Ross	Surveyor	Captain	Rs. 7,200	-	-	7,200	-	
		Lloyd	1st Assistant Surveyor	"	2,800	-	-	2,800	-	Office rent, stores, &c. &c. 21,030 4 7
		Montrion	Draftsman	Midshipman	1,034 10 8	-	-	1,034 10 8	-	
Year 1833 and 1834:		Ross	Surveyor	Captain	Rs. 10,400	-	-	10,400	-	Office rent, stores, &c. &c. 25,055 15 11
		Lloyd	1st Assistant Surveyor	"	7,200	-	-	7,200	-	
		Montrion	Draftsman	Midshipman	3,752 1 8	-	-	3,752 1 8	-	
Flora and Sophia	-	-	-	1st Officer	-	404 12 -	-	404 12 -	-	
Sophia	-	-	-	-	-	-	-	1,902 -	-	
Year 1834 and 1835:		Ross	Surveyor	Captain	Rs. 3,066 10 8	-	-	3,066 10 8	-	Office rent, stores, &c. &c. 25,055 15 11
		Lloyd	1st Assistant	Lieut. I. N.	1,416 10 8	-	-	1,416 10 8	-	
		Montrion	As Officiating Surveyor	"	8,133 5 4	-	-	8,133 5 4	-	
		-	Draftsman	Midshipman	1,675 -	-	-	1,675 -	-	
		-	-	-	-	-	-	1,524 5 -	-	

GEOGRAPHICAL DEPARTMENT IN ENGLAND.

THE expense of the Geographical and Hydrographical Department in England is 300 *l.* per annum, 200 *l.* being for the salary of the Geographer, and 100 *l.* the allowance to him for keeping the Charts in a complete state according to the latest authorities, by the insertion of all new surveys and shoals which are discovered, and correcting positions which have been found to be inaccurate. As regards the marine surveys, it is his duty to prepare them for publication and to attend to the transmission of the Charts, when published, to the different depôts in India, to the Admiralty and to the Company's agents, for sale, also to the supply of additional copies as they are required. He attends likewise to all the general business of the department.

The surveys in India are under the immediate superintendence of the marine authorities at each Presidency.

John Walker.

East India House, May 1851.

(D.)

LIST of CHARTS in the Office of the Superintendent, of all SURVEYS that have been Executed between the Official Years from 1820-21 to 1848-49, under the Orders of the Government of *Bengal*; and also those Executed by Officers of the Royal Navy, of Ports, Rivers, &c., under the Jurisdiction of the Supreme Government, for a like Period.

TITLE or DESCRIPTION of CHARTS or MAPS.	AUTHOR.	By whose Authority.	Date of Survey or Compilation.	Date of Chart.	Number.	Engraved, Litho- graphed, or Manuscript.	Scale to Inch.	Size.
A plain Chart of the track of the H. C. S. "Nearchus," in search of Bale of Cotton Rock.	Lieut. Maxfield, B. M.	- - - -	1821	1821	1	M.	15	49×28
Track of the H. C. S. "Nearchus," in search of the London Bank, with sketch of the coast of Coromandel from the northern extremity of the Pulicat and Armagon Hill.	Lieut. Maxfield, I. N.	- - - -	- - -	1821	1	M.	- -	50½×28½
Survey of Blackwood's Harbour	J. J. Underwood, Lieutenant Engineers.	- - - -	1822	- - -	1	M.	4,000 yds.	29×28½
East Coast of Sumatra, in three parts	Lieutenants Rose and Moresby, I. N.	- - - -	1822	1824	36	E.	5	38×25
Straits of Durian, in one part, incomplete.	Lieut. Moresby, I. N.	- - - -	1822	1823	9	E.	1½	30×23
Passages from Tanjong Bon and Pulo Barellah to the southern entrance to the Straits of Durian.	Lieutenants Collinson and Moresby, I. N.	- - - -	1823	- - -	14	E.	2½	46×22
Chart of River Tavoy	Lieut. Moresby, I. N.	Capt. Hardy, R. N.	1824	1827	60	E.	1¼	25×14
Rangoon River (some copies with improvements by Captain J. Russell, commanding H. C. Steamer "Nemesis") in two sheets.	Captain D. Ross, I. N.		1825	1827	62	E.	1	32×27
Arracan Coast from Diamond Island to the Calventuras, in five sheets.	Lieut. Crawford, I. N.	- - - -	1826	1828	38	L.	2	41×24
Coast of Ava from 16° 50' to 18° N. up to Foul Island, in two sheets.	" " "	- - - -	1826	1827	6	E.	2	35×17
Tavoy and Moscos Island and half of Tavoy Island.	Lieut. C. Court, I. N.	- - - -	1826	- - -	12	E.	1¼	25×15
Part of Tenasserim Coast from latitude 13° 3' to 13° 40' N. including Tavoy River.	Lieut. C. Court, I. N.	- - - -	- - -	1826	1	E.	4	24×14
Singapore Harbour	Captain D. Ross, I. N.	- - - -	1827	1830	106	E.	1	21×19
Harbour and Islands in the vicinity of Singapore.	Captain D. Ross, I. N.	- - - -	1827	- - -	64	L.	1	25×19
Coast of Tenasserim and Islands, 12° 26' to 13° 40' N., second sheet, on large scale.	Captain D. Ross, I. N.	- - - -	1828	1829	46	E.	2	21×37
Tavoy to Mergui.	Captain D. Ross, I. N.	- - - -	1828	- - -	4	-	½	22×39
Part of Tenasserim Coast and Mergui Archipelago, 9° 30' to 12° 50', in two sheets.	Captain D. Ross and Lieut. R. Lloyd, I. N.	- - - -	1828	1828	17	L.	4	50×27
Hastings Harbour	Captain D. Ross, I. N.	- - - -	1828	1829	5	L.	1	26×18
Chart of the Mergui Archipelago, from 8° 27' to 10° 30' N., with improvements, in three sheets.	Captain D. Ross, I. N., and Lieutenant R. Lloyd, I. N.	- - - -	1828	1839	43	E.	4	30×19

TITLE or DESCRIPTION of CHARTS or MAPS.	AUTHOR.	By whose Authority.	Date of Survey or Compilation.	Date of Chart.	Number.	Engraved, Litho- graphed, or Manuscript.	Scale to Inch.	Size.
Martaban to Tavoy Point and Moscos Island, in two sheets.	Captain D. Ross, I. N.	- - - -	- - - -	1828	45	E.	1	25×18
Entrance to Chittagong River	Mr. B ^h Pilot Sinclair	- - - -	1829	- -	1	M.	2	25×18
Chart of Cheduba Roads and Ramree Harbour.	Lieut. R. Lloyd, I. N.	- - - -	- - - -	1829	4	L.	4	15×14
Kyook Phyoo Harbour and Combermere Bay.	Commander Laws, R. N.	Admiral Sir E. Owen.	1830	- -	36	L.	3	46×36
Kyook Phyoo Harbour and Port Selina, including Combermere Bay, Coast of Arracan, in four sheets.	Messrs. Cannon and Icely and Commander Laws, R. N.	Admiral Sir E. Owen.	1830	- -	30	L.	17 ¹⁵	124×40
Chart of part of the Coast of Mergui Archipelago, from 10° 10' to 12° 50', with additions by Lloyd, in two sheets.	Captain D. Ross, I. N.	- - - -	1830	1839	12	E.	4	37×23
Chart of Port Owen, east side of Tavoy Island.	Commander Laws, R. N.	Admiral Sir E. Owen.	1830	- -	23	L.	1 ¹	24×19
Survey of the Islands lying off the Coast of Tenasserim from 10° 10' to 13° 33' N., in three sheets.	Captain D. Ross, I. N.	- - - -	1830	1832	36	L.	4	45×24
Bentinck Sound	N. Icely, R. N.	- - - -	1830	1835	1	E.	1	24×18
River Tavoy	Commander Maingy	- - - -	1828					
Upper Point, River Tavoy	Capt. R. Moresby, B.M.	- - - -	1824					
Port Owen on eastern side of Tavoy Island	Midshipman Julian, R. N.	- - - -	1830					
Tenasserim Coast and Islands	Captain D. Ross, I. N.	- - - -	- - - -	1831	15	L.	1	26×19
Arracan River, with additions, by H. B. Weston.	Captain R. and Lieut. Lloyd, I. N.	- - - -	1832	1834-47	129	E & L.		
Chart of Kyook Phyoo Harbour and the entrance to Hay's Straits, from an original survey by Captain Bowman, with alterations.	Officers of H. M. S. "Satellite."	- - - -	1832	1843	156	L.	1 ¹	30×26
Kyook Phyoo and Combermere Bay	Captain D. Ross, I. N.	- - - -	1832	1833	156	E. & L.	2	30×22
Cheduba and Coast of Ramree	Captain D. Ross, I. N.	- - - -	1832	1834	2	L. & E.		29×23
Cheduba Straits and Coast of Ramree, with additions from the surveys of Captain Halsted, R. N.	Captain D. Ross, I. N.	- - - -	1832	1842	157	E.		30×29
Plan of the Anchorage between Ramree and Juggoo.	Lieut. R. Lloyd, I. N.	- - - -	1832	- -	14	L. & E.	1 ¹	29×22
Combermere Bay, Fletcher and Hay's Straits.	Lieut. R. Lloyd, I. N.	- - - -	- - - -	1833	1	L.	1	49×45
Coast from Chittagong to Arracan River, from Akyab River to 17° 50', including the Terribles and Cheduba.	Captain D. Ross, I. N.	- - - -	1833	1842	107	E.	4	36×24
False Point and its vicinity	Lieut. R. Lloyd, I. N.	- - - -	1839					
Survey River Hooghly from Calcutta to Saugor.	Captain Halsted, R. N.	- - - -	1841					
Part of Sootermooky, Jamerah and Rymutlah Rivers.	Lieut. R. Lloyd, I. N.	- - - -	- - - -	1835	2	M.	1	39×23
Survey of the Sea-face of the Soon-derbunds, from latitude 20° 58' N., in three sheets.	Lieut. R. Lloyd, I. N.	- - - -	- - - -	1836	1	E.		60×28
An Eye Sketch of the Bridge Hurree Creek, and part of the Roymutlah or Mutlah River.	Lieuts. W. Fell and J. Renny, I. N.	- - - -	1837-41	- -	2	M.	1	39×26
Survey of the Sea-face of the Soon-derbunds from Middleton Point to Muyatlah River, including the Eastern Channel.	Lieut. R. Lloyd, I. N.	- - - -	1837-40	1842	20	E.	4	29×59
Chart of Western and South Channel	Lieut. Young, reduced by Lieut. Lloyd, I. N.	- - - -	- - - -	1838	1	M.	1	32×26
Chart of the Northern part of the Bay of Bengal.	Lieut. R. Lloyd, I. N.	- - - -	1840	- -	2	L.	1 ¹	51×24
Arracan and Sandoway Rivers, in four sheets.	Lieut. R. Lloyd, I. N.	- - - -	- - - -	1839	18	L.	2	46×62
Survey of Chittagong or Koornafoolee River.	Lieutenants Young and Rennie, I. N.	- - - -	1840	1842	36	E.	1 ¹	24×16 ¹
Commencement of a Chart of the Bay of Bengal, to be completed from Captain Ross's own surveys.	Lieut. R. Lloyd, I. N.	- - - -	1840-44	- -	2	M.	12	59×28
Survey from False Point to Kedgerree, in 88° 40' E., including Balasore Roads.	Lieutenant R. Lloyd, I. N., and Mr. H. B. Weston, B. S. S.	- - - -	1841	- -	103	E. & L.	4	27×26
Chart of Anchorage of Amherst	Captain D. Ross, I. N.	- - - -	- - - -	1841	2	L.	500 yds.	32×26
Survey of Mergui Harbour	Lieut. Young, I. N.	Marine Surveyor-general R. Lloyd, I. N.	- - - -	1841	65	E.	500 yds.	30×24
Chart of the South Coast of Ava from Negrais to Rangoon and Moulmein, with the Preparis, compiled from the latest surveys.	Captains Ross and Crawford, I. N., and Roe, R. N.	- - - -	- - - -	1841	32	L. & E.	10	28×15
Salween River above Moulmein	Lieut. Nolloth, R. N.	- - - -	1843	1845	1	E.	1	24 ¹ ×18
Lloyd's Channel to Upper Floating Light.	Mr. B ^h Pilot Bedford.	- - - -	1844-45	1844-45	17	L.	1	30×22
Sangarall Reach, with section of the depth of water.	Ditto.	- - - -	1844	- -	1	M.	250 yds.	23×16
Survey of Armagon and Pulicat Shoals.	Lieut. W. Fell, I. N.	- - - -	1846	- -	1	M.	2,000 yds.	58×24

(continued)

TITLE or DESCRIPTION of CHARTS or MAPS.	AUTHOR.	By whose Authority.	Date of Survey or Compilation.	Date of Chart.	Number.	Engraved, Litho- graphed, or Manuscript.	Scale to Inch.	Size.
River of Martaban, and part of the eastward side of the Gulf of Mar- taban, and Moulmein River.	Lieut. W. Fell, I. N.	- - - -	1847	1848	34	E.	1	24×13
Gulf of Martaban from Amherst Point to entrance of Sitang River.	Lieut. W. Fell, I.N.	- - - -	1847	- - -	1	M.	4056 yds.	28×20½
Hooghly River from Calcutta to Cowcolly Lighthouse.	Mr. Bedford, B ^h . Pilot	- - - -	1847	- - -	275	L.	1	39×23
Pagoda Point to Alguada Bay	Lieut. W. Fell, I.N.	- - - -	1848	- - -	1	M.	4000 yds.	20×15
Survey of Lacam's Channel to the east of Moira's Harbour.	Lieut. Maxfield, I.N.	- - - -	- - -	- - -	1	M.	½	7×7
Cape Negrais to Moulmein	Lieut. W. Fell, I.N.	This Chart is not yet received from Lieutenant Fell.						
Plan of Attock, of the Tenasserim Coast.	Commodore Hayes	- - - -	- - -	- - -	1	M.	½	20×16
An unfinished Survey of Malacca Straits about Parcellar Hill.	Lieut. Maxfield, I.N.	- - - -	- - -	- - -	1	M.	- -	31×25
Islands of Cocob and Pulo Pisang, adjoining Coast and Mud Point.	F. A. Cudlip, R.N.	- - - -	- - -	- - -	35	L.	1	24×17
Chart of the Coast of Arracan from Chittagong to Sandoway, in two sheets.	Commodore Hayes	- - - -	- - -	- - -	1	L.	6	54×17½

Note.—Besides the above, there are numerous copies, both in manuscript, lithographed, and a few engraved, by officers of the Bengal sea-service, and other individuals, executed without the orders of Government, and without expense to the State, on which account they cannot be considered as official surveys, and are not included in the above.

Where no authors' names, dates of survey, compilation of the charts are given, and also where the scale is not stated, none of this information is to be found in them, nor the means of ascertaining it. Some are mere sketches without any scale.

Fort William,
Marine Superintendent's Office,
23 August 1850. }

James Sutherland, Secretary.

SAILING DIRECTIONS.

SAILING DIRECTIONS from the North-West Coast of *Cheduba* to *Foul Island*.

THE extreme or N. W. rocks of the N. W. reef of Cheduba lie in 18° 55½' N. lat. and 93° 26' 41" east long., being five miles from the N. W. point of Cheduba. From thence the northern edge of the reef runs nearly east 3¾ miles to Sandy Island, or rather to the end of the reef to north eastward of it, which extends N. E. b. E. ½ E. three-quarters of a mile. As the distance of three-quarters of a mile east from the N. W. rocks is Beacon Island, which can be seen five or six miles, or even further in a very clear day. Its highest point is a round beacon of stones about 12 feet in height. The soundings along the north part of the reef are regular from 4 fms., quarter of a mile from the rocks to 10, 12 and 13 fms. about three miles off to the northward. On any part of this a vessel may anchor in the fine season. No protection can be said to be afforded by the reef in the S. W. monsoon; a vessel once getting round Beacon Island would have the north channel of Cheduba open to her with a fair wind, and would of course anchor between that island and Ramree on rounding Beacon Island for such purpose. There is a detached rock lying N. E. b. E. ½ E. half a mile from the centre of Beacon Island with only seven feet water on it, and 5 fms. close to. The tides here run along and round the point of the reef with great velocity in the springs, but at the neaps do not exceed a knot or a knot and a half an hour. S. S. E. of Beacon Island one mile and three quarters is the harbour rock of Port Childers. Its mass extends E. N. E. and to S. W. about 50 yards; its western end is about 25 feet high and precipitous, and being the largest of the cluster it belongs to, it is therefore easily distinguished. A reef runs out a mile to the westward of it, the outermost rocks of which are dry; off the point of this reef there are 7 fms. within 300 yards of the rocks and 10 fms. a quarter of a mile further out. A little more than a quarter of a mile S. S. W. from the harbour rock is another rock above water, and at the same distance due south from it is a sunken rock on which the sea sometimes breaks, bearing E. ½ N. from which is again another sunken rock about 700 yards distance. These two rocks buoyed mark the northern side of this channel, and with an iron pole beacon to assist in distinguishing the harbour rock, would secure

secure safe ingress and egress to and from this little port. On the southern side of the channel is Rib Reef, so called from the peculiar appearance of the rocks, which resemble the skeleton of a whale or the ribs of a wrecked vessel. The channel is half a mile wide in its narrowest part, and has 6 fms. in the centre, 5 fms. near Rib Reef, and not less than 4 fms. on the northern side near the Channel Rocks. The rocks and reef are steep to. The course in is due east, keeping in mid-channel, till the Volcano Hill, the N.W. point of Cheduba bears S. b. E., when you must haul up E. N. E. till it bears S. b. W., and Sandy Island N. $\frac{1}{4}$ W., which is the best and deepest anchorage in from $3\frac{1}{2}$ to 4 fms. clay, mud, sand and shells much mixed, but affording very good holding ground. Vessels of a light draft may of course go further in towards the shore, remembering that there is here at the springs about $6\frac{1}{2}$ feet rise and fall. It is high water on the beach abreast or S. of the anchorage at 9 h. 30 m. a. m. at full and change. There is no passage through to the eastward except for very small vessels, and even to them it is dangerous if there is much wind, it being very full of rocks to the northward of the White Rocks and very shoal to the southward of them. The northern part of this harbour is deeper than the southern, 3 fms. extending from the above-named anchorage in a N. and N. E. direction more than a mile. East of the same spot you will have $2\frac{1}{2}$ and $2\frac{1}{4}$ fms. for the same distance, and to the southward in nearing the breach $2\frac{1}{2}$ to 2 for a short distance. A vessel wishing to go out from this port when the wind will not allow her to lay through the before-named channel, may pass to the southward of Rib Reef, keeping about a quarter of a mile from it, by which she will avoid several detached rocks on her larboard hand; but as some of these are under water, and a person must trust to his eye rather than anything else, it is not advisable to use this passage, but rather work out of the other, taking care not to approach the rocks too close, as the tide rather sets on them from the middle of the channel to both sides. This harbour is not proposed as safe during the bad weather. The sea soundings outside this port are very regular, gradually deepening from 13 or 14 fms. a mile outside the reefs, to no bottom at 120 fms. at the distance of 14 or 15 miles. To the northward of Beacon Island however, the water is shoaler further out, but there can be no danger in approaching the shore into 20 fms. in the day time or 40 at night. This holds good throughout the coast to which these directions refer, giving a distance by day of two miles clear of the dangers on Cheduba, and a mile further from those south of it, with the exception of Foul Island, which is on every side except the N. E. steep to. The N. W. point of Cheduba is in lat. $18^{\circ} 51\frac{1}{2}'$ N. and long. $93^{\circ} 29\frac{1}{2}'$ E., and is a volcanic hill though of no great height. It is easily distinguishable from its growing nothing but casuarina trees; at present all but one have been felled. Several rocks extend from it more than a mile all round it, and at the distance of two miles is the cluster marked Henry's Rocks, the highest of which is 35 feet out of the water, and can be seen seven or eight miles off. From it a reef runs off in a S. W. direction three-quarters of a mile, terminated by a rock above water, close to which there are 5 fms. and a cable's length of 13 fms. No vessels ought to pass between these rocks and the N. W. point, although there is 6 fms. in the channel, as the tides are very irregular and strong. But in 26 fms. water or about two miles outside these rocks, the tide runs nearly N. and S. about one knot and a quarter an hour, but close to the rocks it is much influenced by them. To the north-eastward of the large rock the reef extends two miles or more, leaving a channel between it and Rib Reef nearly a mile wide, with 7, 8, and 9 fms. in it. One or two large upright rocks are attached to this group. Before taking leave of the N. W. reef, I may mention that Beacon Island and Sandy Island are ordered to be planted with cocoanut trees, which when grown will cause them to be seen nearly from the edge of soundings which in a due-west line is about 17 miles from Beacon Island.

To the southward of Volcano Point the coast of Cheduba runs away as far as abreast of the West Hill in a S. E. b. S. direction, with a few rocks near the beach, the only one worth notice being Oyster Rock, which is level with the water; and bears S. S. W. from Volcano Point and S. E. b. E. $\frac{1}{4}$ E. from Henry's Rock, and is one mile and a half from the beach. West Hill is the highest land on this part of the island, it is a large round topped hill with a large single tree on its summits, which is 1,300 feet above the level of the sea, and can be seen long before striking soundings abreast of it, which are here deeper

in-shore than they are to the northward. No bottom at 120 fms. being to be got at the distance of 10 miles. There is another hill with a single tree on it called N. W. Peak, between West Hill and N. W. Point, but it is much lower. Under the West Hill off the village of Prengowks is a pretty good anchorage for vessels in the N. E. monsoon, although a heavy swell sometimes come in with the sea breeze which blows from about N. W. b. W. They may anchor in from 7 to 10 fms. about three-quarter of a mile from the shore, inside a rock, which always breaks and which is a mark at low water, keeping to the northward of it in coming in. This rock lies about 2,000 yards from the shore and has 11 fms. inside of it in one place, but the generality of the soundings are from 9 to 7 fms. The tides here are very irregular, so much so that they cannot be reduced to any register. Sometimes the current running two or three days to the southward, and then perhaps 24 hours to the N. westward again. The rise and fall on the beach too is at times hardly perceptible, while at others it amounts to six or seven feet. From hence the coast trends with slight indentations about S. E. until you come to the Pyramid Rock. This Pyramid is 187 feet high, very steep, and is in $18^{\circ} 40\frac{1}{4}'$ N. lat. and $93^{\circ} 40'$ E. long. very nearly; it is connected by a reef with the shore to the eastward of it, through which however there are some boat channels. It marks the position of a small harbour on this part of the coast, which in the fine season would be available for native vessels seeking rice. The land from abreast of the Pyramid gradually turns to the eastward, forming the south point of Cheduba, which is in lat. $18^{\circ} 40'$ N. From a point east of the Pyramid a dangerous reef extends nearly three miles in a S. S. W. direction, to the eastward of which and southward of Cheduba is a mass of rocks in very shoal water. About a mile inland and due north from South Point is the South Peak rising to the height of 1,700 feet, and can be seen distinctly 30 miles off in clear weather. It is the highest land in the island. The tides off the South Point run between it and Flat Island with great rapidity, following the direction of the channel, which is very shallow off Flat Island and from thence through to Round Island.

Flat Island Volcano is in $18^{\circ} 38'$ N. Lat. and $93^{\circ} 48\frac{1}{4}'$ E. Long. and the whole Island from N. to S. is four miles and a quarter long. It is nearly divided into two parts, the strip of land connecting them being only about 100 yards wide. Off the south part of it is Hill Island, at the distance of a little more than half a mile, connected with it by a reef of rocks. Off the south end of Hill Island is a remarkable rock in $18^{\circ} 34\frac{1}{2}'$ N. Lat. and $98^{\circ} 48\frac{1}{2}'$ E. Long. which forms the northern side of the entrance to Heyward's Channel. Off the western side of Flat Island, is an extensive patch of rocks and rocky ground, extending three miles to the westward, and terminating by rocks, showing themselves above water. Half way between the northernmost of these rocks, and the extreme of the southern reef of Cheduba, bearing from it W. N. W. at the distance of four miles and a half, is a patch of land and rocks with 3 fms. on its shoalest part, and 9 and 10 fms. round it. But this Channel between Flat Island and Cheduba cannot be passed through by other than large boats, as there is only 6 feet water in the N. E. part of it.

S. 87° E. from the volcano of Flat Island, and at the distance of 6 miles, is a small sandy island, with bushes on its centre, called False Island. At present, it can be distinguished only at a short distance, but having been ordered to be planted with cocoanut trees, will when they grow up, be seen ten or twelve miles. It cannot now be mistaken for any other island. At the distance of five and a quarter miles S. b. W. $\frac{3}{4}$ W. from False Island is a large rock, marked in the chart "Sail Rock," between which and False Island, extends a continuous reef with many large rocks, showing high above the water. This reef, together with the West Shoal, a round rocky patch half a mile in diameter, lying S. W. b. S. three miles from the Sail Rock, constitute the southern or rather eastern side of Heyward's Channel, which is four miles and a quarter in width between the rock off the southward of Hill Island and the West Shoal; which two points form its entrance from the sea. The course through in mid-channel is N. E. b. N., in from $13\frac{1}{2}$ to 5 fms. water as you approach False Island, and the bottom is principally sand. Vessels may anchor in moderate weather with the centre of Hill Island, bearing W. $\frac{3}{4}$ S. and the Volcano of Flat Island N. b. W. $\frac{1}{4}$ W. in from $7\frac{1}{2}$ to 10 fms.

At the distance of $11\frac{3}{4}$ miles S. 40 E. from Hill Island, is Tree Island, which is rather more than three-quarters of a mile long from N. to S. It has a reef extending about three-quarters of a mile from its southern end, and there are several patches and detached rocks all round the east side, but none more than half a mile distant from it. Off the N. W. end at the distance of about 700 yards, there is a rocky spot with 4 fms. on it, but between that and the island there are 6 fms. With these exceptions, it may be approached with safety in fine weather. The West Shoal bears from Tree Island N. 56° W. five miles and three-quarters, and the two form the entrance from the sea to the best channel there is through the line of these islands and shoals, for ships or vessels going to Ramree, Cheduba or Jaggoo. N. 15° E. from the N. N. E. end of Tree Island is a large and dangerous shoal at the distance of three miles and a half, the distance between which and the Sail Rock is four miles and a half, being the narrowest part of the above ("The Childers'") channel. It is bounded on the N. W. side by the False Island Reef, Sail Rock, and West Shoal, which divide it from the Heyward Channel; and on the S. E. side by Tree Island and the shoal to the N. N. eastward of it. The soundings just off and round the West Shoal are very irregular, the bottom principally mud. There are 20 fms. within half a mile of it to the westward, and 13 fms. close to. The mid-channel course is N. b. E. $\frac{1}{4}$ E. with from $13\frac{1}{2}$ and 14 fms. between Tree Island and the West Shoal, to 10 and 12 between Sail Rock and its opposite Shoal N. N. eastward of Tree Island. Further to the northward than this, a vessel will carry 10 and 11 fms. with sandy bottom, and east of False Island, and two miles from it are $9\frac{1}{4}$ fms. sand. This channel is perfectly clear, the shoalest place in the fair way being a little knowl of 9 fms. sand. Tree Island being so very easily distinguished, and seen as far off as 10 or 12 miles, makes it a certain mark on this score for this channel, which is preferable to Heyward's as much from its greater width as from its avoidance of the West Shoal. The tides set through both channels, following their course at the rate of about two or two miles and a quarter an hour on the ebb, and a little less during the flood. Tree Island by observation and triangulation is in $18^{\circ} 26\frac{1}{2}'$ N. Lat. and $93^{\circ} 56\frac{1}{2}'$ East Longitude, and has a hill in its centre with a single large dark tree on its top.

Five miles and a quarter S. $49'$ E. from Tree Island, lies the Nerbuddah Rock, in Lat. $18^{\circ} 23\frac{1}{4}'$ N. and Long. $94^{\circ} 00\frac{1}{4}'$ East. It is a very small pinnacle, a wash at low water, with six fathoms close round it, and 9 and 10 at the distance of three-quarters of a mile, deepening into 15 midway over to Tree Island. The channel between them may be taken by a vessel if necessitated, but it is not to be recommended if possible, to round Tree Island. If taken, the course through will be E. N. E. not passing Tree Island at the distance of more than two miles if possible.

Twenty-five miles and a quarter S. $25'$ E. from Tree Island is Foul Island, which is much higher, and entirely covered with trees. It is about one mile and three-quarters long from N. E. to S. W. and perhaps a mile from N. to S. There is a bank runs off the south point for a few hundred yards, gradually deepening 6, 7, 8, 9, into 13 fms. and a quarter of a mile outside; that on 20 and 25 off the north part of the island, is a sand and mud-bank with $5\frac{1}{2}$ fms. on the shoalest spot, deepening into 7 fms. between that and the island, and into 10 and 14 to the northward and westward. The 10 fms. is the best anchorage mud and sand, about half a mile off shore. With these exceptions, the island is steep to all round, there not being one single detached rock off it. Observations were taken on the top of the hill, which place it in $18^{\circ} 3\frac{1}{4}'$ N. Lat. and $94^{\circ} 8'$ E. Long. N. $21\frac{3}{4}$ E. three miles and three-quarters from Foul Island is the Brougham Shoal, which is a patch of rock half a mile long from N. N. E. to S. S. W. and always breaks. It is nearly steep to, having 5 fms. close to the rocks, 13 a cable's length further off, then 17, and at less than a mile 24 to 27 fms. mud to the southward and westward and 21 and 23 fms. to the northward and eastward. The tides run between this and Foul Island about E. N. E. and W. S. W. one mile and a half an hour. N. 15° W., $12\frac{3}{4}$ miles from Foul Island, is the shoalest spot (viz. 4 fathoms) of what is put down on the Chart as the Four-fathom Shoal. It is a great extent of rocky bottom, with spots of coarse sand and gravel, and coral here and there. The soundings on it vary from

13 fms. to 4, and are very irregular; a very heavy rolling swell appears to come at all times from the westward over this shoal, and the tides run in races and whirlpools very violently over the shoaler parts. There are one or two patches to the S. S. W. of this, but as they have not less than 10 or 11 fms. on them, they can hardly be called dangers. There are 16 fms. in mid-channel between the Four-fathom Shoal and Nerbuddah Rock, and the passage is altogether between 5 and 6 miles wide, but it is not a good one, as there are no marks to carry a vessel through it, unless she get a sight of the Nerbuddah breaking. The vessel or shoal nearest Foul Island to the eastward, bears S. 83° E. six miles and three quarters from Foul Island. It is a very small spot with heavy breakers on it, and is steep to, having 20 and 22 fms. almost close to it all round.

The Williams' Shoal bears S. 77° E. from Foul Island, is about one mile in length from E. to W. with only 2 fms. on its E. and W. ends. These always break, even in a calm. Between the ends there are 5 and 7 fms. rocky bottom, over which rolls a long heavy swell, which sometimes breaks. It is likewise steep to, like the Vestal. A vessel going to the northward and passing to the eastward of Foul Island should keep about two miles from the latter, as the water is deep and clear. The Satellite Shoal was not found, but if it exists, the most likely spot for it is N. 79° E. about 13 miles from Foul Island. The soundings south of Foul Island increase gradually from 30 fms. at the distance of two miles from the island to 50 at the Latitude of $17^{\circ} 50'$ the termination of the Childers' Survey. About 15 miles S. W. of Foul Island no bottom is gotten with 140 fms. of line. Abreast of Tree Island the soundings run out 24 miles before you lose them, at the same length of line, and abreast of the Pyramid at the south part of the Cheduba there is a spot only seven miles off shore when the soundings suddenly go off from 56 to 120 fms. and the next cast no bottom; all within a couple of cables' length.

E. P. Halsted, Commander.

SAILING DIRECTIONS for the Port of *Akyab*, in the Arracan River.

SHIPS sailing for Akyab during the south-west monsoon should steer for the south end of the Western Bolongo, in lat. $19^{\circ} 50'$ N. long. $93^{\circ} 3'$ E., then standing along the coast to the northward and westward about five or six miles off shore, until the light is sighted on the Great Savage, at the entrance of the Arracan River, then steer so as to bring it to bear N. by East or N.N.E., and if they intend to run in during the night, with either of these bearings they will cross the bar in the best water, in three fathoms low water spring tides.

After deepening across it, the course should be altered to N. by W. or even N.N.W., according to the state of the tide and sea at the time, to avoid the western rocks (above water) bearing from the light S.W. $\frac{1}{2}$ S., distant nearly half a mile; the flood tide sets in on these rocks.

When the light bears east in six to nine fathoms on the edge of the flat to the westward, the course must be altered to N.N.E. and N.E. by N., having brought the light to bear S.E. by S. $\frac{1}{2}$ S. the ship will be inside of Passage Rock, which is 5 to 7 feet above water, and bears from the Savage Light N.W. $\frac{1}{2}$ N. distant a quarter of a mile, and should then steer N.E. easterly, to avoid the reef projecting from Faqueer's Point a mile in extent to the south; some of the rocks are above water at half ebb. There is a red buoy placed on the southern entrance in about nine fathoms, which with attention may be seen in a clear night without the moon, and after bringing Faqueer's Point to bear N.W. by N. to N.W. the ship should anchor.

On Faqueer's Point a small lighthouse is nearly finished, the light of which will be a deep red, and will be seen about six miles, or three miles beyond the bar, as a leading mark to clear the Western Rocks, keeping it a little open to the westward of the Savage Light when steering in or out, also to point out when the ship is inside of the reef off Faqueer's Point. With this light bearing N. W. by N. to N. W. is good anchorage, having excellent holding ground and perfectly sheltered from the sea.

A stranger

A stranger should not attempt to run in at night, particularly in the rains, except at high or low water, as the ebb tide runs very rapidly in strong eddies off the Passage Rock, over the dangerous flat to the westward, and the flood in strong eddies upon the rocks.

During the N. E. moonsoon ships bound to Akyab, from the northward, should endeavour to make the table land of the Western Bolongo in lat. $20^{\circ} 1' N.$, then steering due east they will avoid the Oyster Reef in lat. $20^{\circ} 5' N.$ long. $92^{\circ} 40' E.$, which is distant from the Savage Light 15 miles due west. This course is recommended, as although in favourable weather the Savage Light is seen outside the reef in 16 to 17 fathoms water, the depth suddenly decreases, and the probability of hazy or rainy weather would prevent the light being seen, and steering boldly in to sight it, to the northward of lat. $20^{\circ} 1'$, would endanger the safety of the vessel, by suddenly falling upon the Oyster Rock or Reef before sighting the lighthouse.

I would not advise strangers on any occasion to make use of the channel inside of the Oyster Rock or Reef.

James Paterson,

Comdr. H. Co.'s Ship "Amherst."

THE directions above given by Captain Paterson were published in 1844. The Red Light referred to was finished and first exhibited in 1845. In 1848 a red buoy was laid on the N. E. edge of the bar in $3\frac{1}{2}$ fathoms low water.

The following additional directions are therefore considered necessary by the Port Master, and by Captain Dicey of the Honourable Company's steamer "Tenasserim."

In the event of the red buoy on the edge of the bar breaking adrift, it is recommended in working across the bar not to bring the Great Savage Light to bear more easterly than N. E. by N. until you deepen over. When you do so, Captain Paterson's directions may be followed.

Captain Paterson's caution as to not going at night, must still be attended to, as the Red Light is not seen till the bar is crossed.

By order of the Superintendent of Marine.

Fort William, }
31 October 1849. }

(signed) *James Sutherland,*
Secretary.

SAILING DIRECTIONS for the *Sand Heads*.

The PILOT STATION for the River Hooghly in the South-west Monsoon.

Directions for approaching the Pilot Station for the River Hooghly during the South-West Monsoon.

EXPERIENCE of the new pilot station off the south channel having established that it can be made by vessels from False Point with the greatest facility, and that pilots can also be readily supplied, and the same causes existing which originally rendered necessary the removal of the pilot station from off Point Palmyras to a position about 15 miles S. W. b. W. of the Outer Floating Light in latitude $20^{\circ} 56' N.$ long. $88^{\circ} 03' E.$, and in from 17 to 22 fms. water, Notice is hereby given that this latter station will in future be continued during the S. W. monsoon, viz. from 15th March to the 15th September.

No difficulty can possibly be felt in passing from False Point to the present station, if common attention be paid to the lead and to the following directions, prepared by Captain Lloyd, late Officiating Marine Surveyor-general, after a careful survey of the ground between the two points.

" False Point Lighthouse is in latitude $20^{\circ} 19 \frac{1}{2}'$ N. and longitude $86^{\circ} 47'$ E., and the South Channel Buoy in latitude $20^{\circ} 59'$ N. and longitude $88^{\circ} 4'$ E., and bears from the lighthouse N. 61° E. true, or N.E. by E. $\frac{1}{4}$ E. by compass, distant 83 miles, and is laid in 12 fms.

" A bank of soundings extends from off Point Palmyras in a direction towards the tail of the Western Sea Reef, and the nature of the bottom (as distinguished from that of the Hooghly deposit, which is sand, and mud with shining specks) is a gravelly substance composed of sand, shells, and small pebbles discharged from the 'Kunka,' and other rivers near Point Palmyras, the lighter material of which being carried further out, is deposited, and forms what is called the 'Pilot's Ridge,' which in crossing to the north-westward shows a little less water than on either side. In coming from seaward you shoal rather suddenly from 28 to 23 fms. upon its eastern edge. It is composed of a shelly sand, or minute gravel of a reddish or rusty brown colour.

" The best guide therefore to enable a vessel to direct her course from False Point to the pilot vessels at the present station, will be to run down the edge of the 'Pilot's Ridge,' which can readily be done by making the lighthouse and bringing it to bear about W. S. W. or S. W. by W. distant by computation from 10 to 15 miles, then steering to the E. N. E., and having gradually increased the depth of water to 23 fms. upon the eastern edge of the ridge, regulate the course to keep between it and 27 fms., when by attention to the lead and nature of the soundings, course, and distance run from the lighthouse, it is almost impossible to miss the pilot vessels (if the above limits are kept within) either by getting too far to windward or falling to leeward, for the soundings increase so rapidly to seaward from the present station, that 28 fms. will not be more than three or four miles to the southward of it, and 23 fms. the same distance to the westward of it.

" The soundings to seaward of the ridge are in general a greenish or olive-coloured mud, with occasionally a few bits of broken shells mixed with it."*

Vessels approaching the station during the day are required to show the usual signal for a pilot, and by night to give as early and as much warning as possible by firing guns, burning blue lights, and by exhibiting two lights in a vertical position, where best seen, but commanders are strictly enjoined to avoid as much as possible making the station during the night.

Ships have been lost from running for the station in dark, or threatening, or actually bad weather. In such weather the pilot vessels cannot be made out, and if fallen in with cannot board the inward-bound vessel, nor could the pilot take her in if he was on board. No advantage then is gained by attempting to get a pilot in such weather, while the danger is imminent. It is strongly recommended therefore to commanders under such circumstances to put their ships under snug canvass while well out in deep water, and keep to sea.

To mark the station, one of the pilot vessels will show during the day a large St. George's jack (white with red cross) at the main topgallant-mast head, and a good mast-head light during the night, and will burn a blue light and a maroon alternately every half hour, and fire a gun at 8 P.M., at midnight, and at 4 A.M. Vessels approaching the station, and while there, as well as when approaching the† light and buoy station vessels, are warned to be careful in avoiding collision by night or by day, and in communicating with either of the above vessels either at anchor or hove to, when it is necessary to cross her to pass under the stern; several instances of serious damage having occurred during the S. W. monsoon, whereby the outer floating light was more than once compelled to leave her station for repairs, to the great inconvenience and risk of vessels entering and quitting the river.

By order of the Superintendent of Marine.

Fort William, }
18 August 1848. }

James Sutherland,
Secretary.

* The only alteration made in the above admirable direction of Captain Lloyd is that of substituting the expression "present station" for "proposed new station," which, as more than five years have elapsed since the change so indicated was adopted, might mislead.—J. S.

† The light vessels are directed when another vessel is approaching during the night, to show a light at the gaff end to mark the way they are riding.

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John Walker.

East India House, May 1851.

RETURN as to what Establishments of OFFICERS and MEN, the Size and Descriptions of VESSELS, and what other Measures are necessary to re-survey doubtful Positions, to correct known or admitted Errors, to survey unsurveyed Positions, and to replace obsolete Charts and Sailing Directions which now exist, or would be requisite.

THE Court of Directors has not considered it necessary to have any special establishment in India for the re-survey of doubtful positions, to correct known or admitted errors, &c. &c., but whenever it becomes necessary to make such re-survey, the Governments in India appropriate for that purpose vessels of the Indian Navy. It will be seen from the following statement of re-surveys which have been executed, that the Governments in India keep this important subject in view.

Re-surveys, and Additions and Corrections to former Charts :—

Entrance to the Hoogly in 1841; Coast of Aracan in 1841; Gulf of Manaar, Coast of Madura, Tuticorin, in 1842; Martaban River in 1847; Laccadive Islands in 1848; Suez Harbour in 1848; Persian Gulf in 1849; Algoada Shoal in 1849; Pulicat Shoal and Mootapilly Bay in 1848; Gulf of Cutch in 1850, besides many others.

John Walker.

East India House, May 1851.

TRIGONOMETRICAL SURVEY.

THE Court of Directors have repeatedly impressed upon the Governments of India the necessity of having the marine surveys constructed upon the basis of the trigonometrical survey, as will be seen by the following extracts from their despatches, viz. :

EXTRACT Marine Letter to *Madras*, dated 24 August, No. 7 of 1842.

WE have received the papers relative to the survey of the Gulf of Manaar, which accompanied your secretary's letter in the Revenue Department, dated 15th November 1841, No. 63. We have also received the surveys commenced by Lieutenants Powell and Ethersey, and continued by Mr. J. J. Franklin, of the Coast of Madura, from Paumbem to Valinookum, of the western side of Palk's Straits, from Paumbem to Point Calimere, and of the Manaar Channel.

It would have been more satisfactory if the latitudes and longitudes of these surveys had been based upon the trigonometrical survey of India now in course of execution; a net of secondary triangles has been extended by Colonel Lambton from the meridional arc to Ramisseram Island, which passes through the whole line of the survey from Paumbem to Valinookum. This would have formed an excellent base upon which the latter might have been constructed, and would then have connected it with Madras, and all the other ports on the coast. The actual place from which the first meridian of the surveys of Messrs. Powell, Ethersey and Franklin has been measured, viz., Point de Galle, not being included in the trigonometrical survey of India, its position is not so accurately determined, and it cannot be considered so eligible for a point of departure as stations comprised within the general triangulation of that survey. We forward herewith a sheet of Colonel Lambton's triangulation along the coast of Madura, on which the latitudes and longitudes of the various stations are written as computed by him, and by which Mr. Franklin will be enabled to verify his survey.

EXTRACT Marine Letter to *Madras*, dated 2 November, No. 8 of 1842.

WE have received the chart of the Roadstead and Harbour of Tuticorin, executed by Mr. Franklin, which accompanied your secretary's letter in the Revenue Department, dated 13th June 1842, No. 39. We took occasion lately to express a wish that Mr. Franklin should take the trigonometrical survey of India as the base of his operations, and in the chart before us we perceive similar discrepancies to those which we noticed in former portions of his labours. For instance, Mr. Franklin places the obelisk on Hare Island in latitude $8^{\circ}45'33''$, whereas according to the trigonometrical survey, it should be in latitude $8^{\circ}47'17''$, a difference of one mile and three quarters. The flag-staff at Tuticorin is misplaced to the same extent, and there is also considerable difference in the meridional distance of the two surveys; you will accordingly direct Mr. Franklin to correct his charts by the sheet of Colonel Lambton's triangulation along the Madura coast, which was transmitted to you with our marine despatch of the 24th August last, and furnish us with fresh copies as early as possible, in order that they may be engraved and published for the benefit of navigation.

EXTRACT Marine Letter to *Madras*, dated 12 January, No. 1 of 1848.

WE have received with your letter, No. 3 of 1847, copies of the survey of a portion of the Coromandel Coast from Ennore to Armogham, and of the bay of Coringa, by Lieutenant W. Fell. It is several years since the triangulation of the Peninsula of India was completed. No marine survey therefore should be undertaken without having that triangulation for its basis. These charts appear to be deficient in that respect, as no latitudes or longitudes are drawn upon them. It is our desire to have another copy of each, with the necessary additions inserted.

COPY Marine Letter to *Bombay*, dated 13 March, No. 23 of 1850.

1. ON referring to the sketch chart which accompanied the report of Commander Montriau, transmitted to us with your letter No. 89, of the 17th October last, and which shows what surveys have been executed by officers of the Indian navy. We perceive that the survey of the whole of the eastern coast of India has been completed, but that of the western coast some portions are marked as only partially surveyed, and others as being still unsurveyed.

2. We think it important that the survey of the unfinished portions should be undertaken without further delay, and we should wish you to make such arrangements for that purpose as you may think expedient. The execution of the work to which we allude would be greatly facilitated now that the trigonometrical survey has been extended along nearly the whole line of coast.

EXTRACT Marine Letter to *Bengal*, dated 17 April, No. 15 of 1850.

Para. 6. We are glad to learn that this survey is complete, and we are desirous of having a copy of the chart as early as possible, with latitudes and longitudes drawn in conformity with the trigonometrical survey of India.

Letter from, No. 39, dated 8 November 1848.
—Completion of the Survey of the Coromandel Coast between the Santipilly Rocks and the Pulicat Shoal.

From Sir Vansittart Stonhouse, Bart., Accountant-General, to Sir H. C. Montgomery, Bart., Chief Secretary to Government.

Fort St. George Accountant-General's Office,
27 March 1850.

Sir,

WITH reference to the order of Government, No. 183, dated 4th May 1848, calling for a statement of the expenses incurred since the year 1820, in regard to the expenditure in the Hydrographic Departments of the East India Company under this Presidency, for all the maritime surveys carried on under their authority, and adverting to my letter of the 6th February 1849, No. 33, I have now the honour to submit, for transmission to the Government of India, a statement of the expenses in question, from 1830-31 to 1846-47, amounting in the aggregate to Company's Rupees 3,54,943. 8. 7., and to explain the circumstances under which the statement in question does not embrace the expenses incurred on this account for the previous period, namely, from the year 1820, being the year specified in the resolution of the House of Commons, dated 10th February 1848, communicated with the order of Government under reference.

I have already explained to the Government in my letter quoted in the preceding paragraph, that there was no information which their office possessed of the heads of account under which similar charges were formerly exhibited, and that it became necessary in consequence to trace the charges through the several heads of account under which they may possibly have been carried. This examination was entered into and completed, but the entries in the accounts furnished to this office do not exhibit, under the heads which have been examined, any particulars of the charges debited therein, which it was found could only be ascertained on reference to the vouchers thus charged, which were not in this office, but in that of the civil auditor. I have also already explained in my former communication, that that officer was applied to for a statement containing such information, in detail, as the records of his office furnished relative to these charges, and that this requisition led to a request on his part to be furnished with an extract from the ledgers of this office, showing the dates and amount debited on account of the present expenditure, to enable him to furnish the information called for. Extracts from the ledgers of the heads under which these charges may have been possibly carried, have been accordingly prepared,

prepared, and furnished to the civil auditor; but it will be seen from the accompanying copy of his letter, dated 10th January last, with which he transmitted a statement of these charges from 1830-31 to 1846-47, that the accounts and vouchers of his office from 1820 to 1829-30 relative to maritime charges were found, after a diligent search, to be so incomplete from loss and damage done by damp, white ants, &c., that it is impossible for him to furnish a correct detail of the required expenditure for these years.

I may further state, that the head "Marine Charges" and the other heads which have been examined, as those under which these charges may possibly have been carried, do not exhibit entirely and exclusively charges of the nature of those adverted to in the Honourable Court's despatch, but include other items also apparently not connected therewith, as would seem from a reference to the statement furnished by the civil auditor, and comparison of the amount exhibited therein with those in the extracts from the ledgers prepared in this office already referred to, and in the absence of the vouchers to which the charges thus debited refer, it is impossible for this office to separate the charges so as to enable it to furnish an account of the expenditure for the period prior to 1829-30 from the year 1820.

I have, &c.

(signed) *T. V. Stonhouse,*
Accountant-General.

From *A. F. Bruce, Esq.,* Civil Auditor, to *Sir Vansittart Stonhouse, Bart.,*
Accountant-General.

Fort St. George, Accountant-General's Office,
10 January 1850.

Sir,

WITH reference to your letter of the 30th November last, and your previous communications on the same subject, I have the honour to forward herewith a statement exhibiting the expenditure incurred in the hydrographic departments of the East India Company under this Presidency, for objects connected with the maritime survey conducted under their authority, and for all land and sea marks, &c., as far as such expenditure is found contained in the accounts furnished to this department, from the official year 1830-31 down to 1846-47. From the year 1820, the period named in the resolution of the House of Commons, dated 10th February 1848, to 1829-30, the accounts and vouchers in this office* relative to maritime charges, are, it is found after a diligent search, so incomplete from loss and from damage caused by damp, white ants, &c., that it is impossible for me to furnish a continued or correct detail of the required expenditure for those years.

*Fort St. George,
Civil Auditor's
Office, 10 January
1850.

I am, &c.

(signed) *A. F. Bruce,*
Civil Auditor.

To *Sir Vansittart Stonhouse, Bart.,*
Accountant-General.

(A true copy.)

(signed) *T. L. Lushington,*
Assistant Accountant-General.

(True copies.)

(signed) *H. C. Montgomery,*
Chief Secretary.

REPORT on the Means adopted by the *Madras* Government since the Year 1820, for facilitating the Navigation of the Coasts of the *Madras* Presidency, including Notices of the SURVEYS executed, the LIGHTS, BEACONS, and BUOYS established, with other information called for in the Order of Government, dated 4 May 1848, No. 183.

1. No regular marine establishment afloat ever having been attached to the *Madras* Presidency, the surveys of its sea coasts have been principally undertaken by vessels of the Indian navy or Bengal marine, whence doubtless the details of their services will be furnished. The only two exceptions are to be found in a survey of Blackwood's Harbour by Major De Havilland and Captain Maxfield in 1822, and in the survey of the Gulf of Manaar and Palk's Bay in 1839-45, by the present secretary to the Marine Board.

Blackwood's Harbour, surveyed by Major De Havilland and Captain Maxfield.

2. The inconvenience and occasional hazard experienced by vessels lying in an open roastead like *Madras*, having been brought to notice, the Government directed their attention to that part of the coast least removed, which, from natural circumstances, appeared to offer a more eligible position for a general anchorage. Major De Havilland, the inspector-general of civil estimates, and Captain Maxfield, first assistant to the marine surveyor-general, in command of the Honourable Company's surveying vessel "*Henry Meriton*," having in 1822 examined the Armegon Shoal, inside which the naval commander-in-chief, Rear-Admiral Sir Henry Blackwood, had lain at anchor in Her Majesty's ship "*Leander*" for four days during the S.W. monsoon, pronounced its southern end capable of affording shelter, with a little assistance from art, to a safe and commodious haven between it and the shore, which might be frequented with safety all the year round; and with the view of testing its capabilities, the Supreme Government in 1823 engaged the "*Mary Ann*," Captain Cowels, to ride out the N.E. monsoon of that year in what was termed Blackwood's Harbour.

Captain Grant's Report.

3. During this time Captain Grant, then master-attendant at *Madras*, visited the place, and at once saw that it was not likely to realize the anticipations entertained. In a report submitted to the Marine Board, he stated that very little protection was afforded by the Armegon Bank, and in fact that in the ordinary monsoon weather the sea in the anchorage was equally turbulent, and the surf on shore just as violent as they were at *Madras*; although he observed that they did not proportionably increase with a gale of wind, which may be readily accounted for by the shoal being of insufficient height to check the ordinary monsoon wave, although it presented an obstacle to the free passage of the more elevated undulation of a gale. Captain Grant also noticed the inconvenience that would arise from the discharge and shipment of cargo at a place so far removed from the Presidency, to connect it with which a canal of 20 miles length would have to be cut; and finally observed, that few vessels would ever make use of it, and for these reasons: during the fine weather all vessels would of course prefer anchoring at *Madras*, where the whole of their business was to be transacted, and in the two first months of the N.E. monsoon they would rather avoid altogether touching on the coast. Under all circumstances therefore the intention of forming a harbour here was abandoned, and the project is not likely again to come under consideration, further experience having proved, that with due care and attention to the fitness of a vessel's ground gear, the *Madras* Roads afford a safe anchorage all the year round, and are only to be feared on the approach of a hurricane, when sufficient warning is invariably given to enable vessels to escape its fury, provided the commanders attend to the instructions founded on Colonel Reid's theory on rotary storms, so clearly explained in Mr. Piddington's "*Horn Book of Storms*," a work which every officer ought now to have in his possession.

4. Major De Havilland, Captain Maxfield and Sir Henry Blackwood, after whom the proposed harbour was to be named, were all strongly impressed in favour of the project which was to convert this spot into the future rendezvous of vessels trading to this Presidency; and in justice to these officers, the fact must

must not be omitted, that at the time when their survey was made, considerably less water existed on the Armegon Shoal than at present. The first-named officer reported that for ten miles the outer or eastern edge of the bank had only (12) twelve to (14) fourteen feet water over it, whereas Lieutenant Fell's late survey shows the depth to average from (14) fourteen to (18) eighteen feet at low water, with the exception of one or two knolls, the extent of which is too limited to afford shelter for vessels under their lee. It is well known that the sea has encroached on many parts of the coast during the last half century, and it is far from improbable that the same causes may have produced similar effects on the shoal in question, thus rendering the so-named harbour less open to improvement than it formerly might have been.

5. The only other maritime survey carried on by officers actually on the Madras establishment, is that of Palk's Bay and the Manaar Gulph, undertaken in connexion with the deepening of the Paumbem Channel, to facilitate the passage of vessels from one side of India to the other, without their being forced to round Ceylon *via* Point de Galle, which confined all small craft to one voyage during the year, it requiring even a powerful steamer to make any progress against the S. W. monsoon after passing the Basses, if proceeding within a moderate distance of the island. Large vessels making the passage at this season of the year, invariably make southing till in the S. E. trade, run down sufficient longitude, and then stand again to the northward. In this way a ship from Madras bound to Tuticorin in the S. W. monsoon is usually a month or five weeks making the voyage.

Survey of the Gulf of Manaar and Palk's Bay.

6. As far back as May 1822, the Marine Board brought to the notice of Government the advantage that would be derived from improving the communication *via* Paumbem; the principal aim then being the removal of some rocks, which being situated in the very centre of the narrow winding passage then in use, formed a considerable impediment to vessels of even the smallest description passing through. Captain Fullerton, the civil engineer of the southern division, under instructions from Government, examined the locality in the latter part of the same year, and stated that the ridge connecting the Island of Paumbem to India, through which the channel was formed, being of sandstone, of no great degree of induration, varying from (3) three to (8) eight feet in thickness, and in many places in detached masses, little difficulty would be experienced in overcoming the obstacle which then existed to the free navigation of the passage for small craft. With reference to the sand-bank to the southward, he anticipated that in deepening the northern channel, the current would force for itself a free passage of equal depth in that direction, although he prudently observed, that time would prove whether his expectations were well founded.

Paumbem Channels.

Captain Fullerton's Report in 1822.

7. Before proceeding, however, to the measures that were undertaken by Government to facilitate the passage of vessels from one side of the Peninsula of India to the other, it may be as well to give a short description of the nature of the formations that obstruct the communication.

8. The Island of Ceylon is separated from India by two deep bays or gulfs, the northernmost one called Palk's Bay, having a depth of from (5) five to (7) seven and (8) eight fathoms, and that to the southward called the Gulf of Manaar, in which the depth has not been ascertained beyond a few miles from the land, when soundings are lost with from (100) one hundred to (150) one hundred and fifty fathoms of line. These bays terminate in a line of sand-banks called Adam's Bridge, which with the islands of Manaar and Ramisseram, and a rocky ledge extending from the latter to Tonitory Point (otherwise designated Point Kamen) serves to connect the land of Ceylon at Mantotte, with that of India, at the before-mentioned point. The distance across in a direct line is about (48) forty eight miles, although it would be found somewhat more by pursuing the undulating course of this natural barrier, and through it are four channels more or less navigable to the small craft that ply along the coasts connecting the bays one with the other.

Description of the barrier connecting India with the Island of Ceylon.

9. Manaar, the western island, about (16) sixteen miles long, is situated about a mile from the coast of Ceylon, from which it is separated by a few small islets and extensive mud and sand-banks, through which winds the

Manaar Channel. narrow and tortuous passage named the Manaar Channel, which being about (9) nine miles in length, and having shifting bars of no greater depth than (5) five feet at high water, is only calculated for the navigation of the smallest description of craft, which are generally tracked or dropped through as the current may be against or in favour of them. At the west end of Manaar, where commences the so-termed bridge, is the second channel, called the Talmanaar Channel, from its proximity to a village of that name. In it, the depths average from four to six feet at high water, with but four at the southern end, thus debarring all but dhoney craft from using it.

Adam's Bridge.

Tannikoody Channel.

10. Adam's Bridge is composed of hard sand, partly above water when the tide is out, and extends from Talmanaar in a W. N. W. direction for (17) seventeen miles, till it meets the long sandy tongue that forms the S. E. extremity of the Island of Ramisseram at Tannikoody, where is situated the third navigable channel, but with no greater depth than the one previously described, and consequently of no greater utility. The bridge varies in breadth from half a mile to two miles, with from (3) three to (7) seven or (8) eight feet over it at high water; but having always a heavy surf breaking on its weather side, and generally on both, it is quite impassible to all but the smallest description of dhonies, and to them only during very fine weather, and when they are light. The depths to the north are (4) four to (5) five fathoms at three miles, and the same to the south at one to one and a half mile, the former being fine sand, such as is found in places free of rock, the latter the coarse gravelly mixture that indicates the presence of a rocky substratum. At (12) twelve to (13) thirteen miles south soundings are lost from (20) twenty fathoms rock to no bottom at (150) one hundred and fifty.

Paumben Channel.

*** Colonel Sim's Report.**

11. The Island of Ramisseram is (14) fourteen miles long, from Tamikoody to its west end, where is situated the channel that is now in course of improvement, cut through the ledge of rocks that joins the island to the continent of India at Tonitory point. This ledge, which is (2,250) two thousand two hundred and fifty yards long, was originally entirely above water, and the records* of the Pagoda at Ramisseram, relate that, until the early part of the 15th century, the Swamy was on certain festivals carried across in procession to the main-land of India, by this route three times a year. In 1480, during the reign of Achoodapah Naig, Rajah of Madura, a small breach in the dam was made during a violent storm, and subsequently, during a second, this was enlarged; the gap was then filled up and the road repaired, but about ten years afterwards a hurricane occurred, which destroyed the communication to such an extent, that no further attempt was made to preserve it, and each succeeding storm has had its share in undermining and breaking down the barrier, till it arrived at the state in which we now find it.

12. The operations in Ava having occupied the Government shortly after the preliminary steps before adverted to were taken, no progress was then made in the contemplated improvements, but in November 1828, the war having been brought to a successful termination, the Government again took the subject under consideration, and Major Sim, then inspector-general of civil estimates, was deputed to report fully on the practicability of making a channel that might render the communication free to large vessels, and to enable him the more readily to examine the locality, the schooner "La Belle" and the Honourable Company's anchor boat were placed under his orders.

Colonel Sim's Report in 1829.

13. In November of the following year 1829, this officer furnished a very full and luminous report, submitting three plans for the attainment of the general object in view, namely, the improvement of the communication.

1st. To straighten the channel then in use, without deepening, further than removing the rocks which obstructed it, many of which he had already displaced with the means then at his disposal, enabling, as he states, one or two keeled vessels, drawing about six feet, to pass through.

2d. To deepen the same opening to (8½) eight and a half or (9) nine feet at high water; or to make another of that depth about (1,300) one thousand and three hundred yards from the west end of the dam, where the natural obstacles were not so great, although its position (being nearly midway between the island and India) would be less sheltered.

3d. To

3d. To make a channel of twelve or fourteen feet at high water, either by deepening that then in use, or cutting through the promontory, where advantage might be taken of a natural channel about two miles west of Tonitory Point, which the sea had opened during a hurricane in 1814.

14. The breadth of the land is here (728) seven hundred and twenty-eight yards, with a depth of water of fourteen feet (400) four hundred yards from the north shore, and (15) fifteen feet (100) one hundred yards from the south ; and Major Sim considered that a channel such as proposed might be excavated here with comparatively little difficulty at a moderate expense, although there was still some doubts as to whether it could be kept open on the south side, even by carrying it out into deep water, and placing a breakwater at right angles to its mouth to allow of the current passing out to the southward without being impeded by the swell of the S. W. monsoon, which causes a considerable surf to break on the beach, although protected by the chain of reefs and islands that lie between two and three miles from the shore.

15. Yet even with this doubt as to ultimate results, the deepening the channel then in use to an equal extent appeared to him a work of so much labour, expense, and uncertainty, that he felt he could not with propriety recommend its attempt. The dam through which it would have to be cut is composed of two distinct rocky ledges (140) one hundred and forty yards apart ; the northern one being entirely, and the southern one partly uncovered at low water, although the former is not now sufficiently connected to stop the flow of water at any time of tide. The bottom between these ledges is composed of large detached masses of sandstone, with sand and gravel in the interstices, a formation of the same nature extending (800) eight hundred yards north and (200) two hundred yards south. A distance, therefore, of nearly (1,200) one thousand and two hundred yards would require to be excavated to a depth which, on examination, was found to average about four feet ; and Major Sim was doubtful whether the outer part would not fill in again from the bottom on either side, not being sufficiently above the level of the channel itself to force the current through with that impetus required to prevent the deposit of sand or silt. He also expressed a doubt regarding the practicability of keeping open the channel over the Horse-shoe Bank, which would require to be deepened in proportion to the advance made in the opening to the northward ; one point considerably in favour of the cut through the mainland being its perfect independence of this bank, which would be left a long way to the eastward.

Description of the reef in 1829.

16. In conclusion, this officer, with whom was associated Second Lieutenant now Major Cotton, of the Engineers, of whose services he speaks in the highest terms of acknowledgment, observes that nothing beyond a very rough estimate of the cost and time required for completing any of the plans could be hazarded, owing to the entire novelty of the undertaking in India not permitting the slightest comparison to be drawn, and for this reason he strongly recommended that an application should be made to some competent engineer in England who had been engaged in works of a similar nature, before any particular line of operation should be determined on. The following statement was, however, given, as the nearest approximation that, with their limited knowledge of the subject, could be arrived at :—

	Probable Cost.	Time required for Completion.
For making a channel 50 feet wide, 8 or 9 feet deep at high water, 1,300 yards from the west end of the dam - - - - -	C. Rs. 70,000	Two seasons.
Deepening the old channel to the same extent -	1,50,000	Three years.
Deepening either to 12 or 14 feet at high water -	So uncertain, that no estimate could be furnished.	
Opening a channel of the same depth two miles west of Tonitory Point - - - - -	1,50,000 to 4,00,000	Time uncertain.

Rear-Admiral Sir
E. Owen's opinion.

17. The naval commander-in-chief, Rear-Admiral Sir Edward Owen, having evinced considerable interest in the measures the Government were anxious to promote, Major Sim's report was submitted to him for any suggestions he might feel disposed to offer. His advice was, to take advantage of the channel already there, every rock removed from which would increase the facilities of the navigation, whereas in making a cut through the promontory, no benefit could be derived till the completion of the undertaking, which might occupy a number of years, and the success of which was after all a matter of uncertainty. This plain-sense view of the question was immediately adopted; the subject was referred to the Honourable the Court of Directors, and meanwhile the operations were confined to a gradual improvement of the original channel, a mode of proceeding which the Honourable Court subsequently approved and sanctioned in 1836. An officer was then placed in charge of the operations, with a strong body of convicts, and a company of Sappers and Miners, to carry on the work of blasting and dredging, for which latter purpose a hand-dredge was constructed and worked with considerable effect for several years. This was replaced in 1847 by a steam-dredge, built at Cochin, which is now in use, but which does not answer so well on rocky bottom as the other.

State of the passage
in 1828.

18. The whole of these operations being under the direction of the chief engineer, it is not for this department to enter into details, but their general results may be mentioned. Major Sim, in the report before noticed, states that in 1828 there were obstructions in the channel, having but ($5\frac{1}{2}$) five and half feet of water over them at high water, and that no vessels, except in the finest weather, attempted to pass through drawing more than (4) four to ($4\frac{1}{2}$) four and half feet. During the preliminary examination he was engaged upon in 1829, he removed some of the principal obstacles, and speaks of the effect as having enabled one or two keeled vessels, drawing six feet, to pass through, a circumstance evidently not of ordinary occurrence at that time. The northern channel has now a depth varying from (8) eight to (10) ten feet at dead low water springs, which, with a rise between ($2\frac{1}{2}$) two and half and ($3\frac{1}{2}$) three and half feet, enables vessels drawing ($9\frac{1}{2}$) nine and half to (10) ten feet to pass through without difficulty. On the south, the passage over the Horse-shoe Bank has been dredged throughout to about 10 feet at low water, without the slightest indication of its filling up. An establishment of native pilots, under the superintendence of an active Indo-Britain, is kept up by Government at an annual expense of (2,436) two thousand four hundred and thirty-six rupees; the returns on account of port charges, which include pilot and all other charges, being for Fusly 1257 (Rs. 6,634. 12.), six thousand six hundred and thirty-four, and annas twelve.

State of the passage
in 1848.

Amount of port
charges.

Trade passing
through Paumbem
passage.

19. As a natural sequence to these extensive improvements, the trade through the Paumbem channel has gradually acquired a vigour which has, in the course of 13 years, more than quadrupled its former amount, and the annexed statement not only exhibits the progressive increase in the quantity of tonnage passing through, but shows that a superior description of vessel is being thereby brought into action. As long as the passage from the Coromandel to the Malabar Coast, on the west side Ceylon, was confined to one voyage in the year, the dhoney, a very frail description of craft, was in general favour as being less expense, and as easily sailed with a fair wind as any other, but now that the communication renders the passage practicable at all seasons, this is giving way to the more substantial brig and schooner, able to work down the Gulf of Manaar against the S. W. monsoon, a feat which 50 years back few English ships would attempt. These are built by natives at Cochin, Negapatam and Nagare; most are of teak, and many of them coppered, and being generally commanded and manned by natives, afford an interesting specimen of their advance in the science of navigation.

STATEMENT showing the Number of VESSELS and their TONNAGE that passed through *Paumbem* during the Years 1834, 1839-1847.

YEARS.	Number of Vessels.	Increase.	Decrease.	Amount of Tonnage.	Increase.	Decrease.	Number of Dhories.	Increase.	Decrease.	Total Number of Vessels and Dhories.	Increase.	Decrease.	Total Amount of Tonnage.	Increase.	Decrease.
1834	-	-	-	-	-	-	738	-	-	-	-	-	30,000	-	-
1839	195	-	-	10,728	-	-	1,148	-	-	1,343	-	-	64,834	-	-
1840	213	18	-	11,633	905	-	1,187	39	-	1,400	57	-	74,581	9,747	-
1841	301	88	-	18,406	6,773	-	1,408	221	-	1,709	309	-	93,038	18,457	-
1842	289	-	12	17,668	-	738	1,369	-	39	1,658	-	51	88,309	-	4,729
1843	434	165	-	28,586	10,918	-	1,407	38	-	1,861	203	-	96,785	8,476	-
1844	517	63	-	34,904	6,318	-	1,527	120	-	2,044	183	-	115,898	19,113	-
1845	687	170	-	48,605	13,701	-	1,223	-	304	1,910	-	134	112,217	-	3,681
1846	760	73	-	56,682	8,077	-	1,120	-	103	1,880	-	30	113,901	1,684	-
1847	849	89	-	63,541	6,859	-	1,132	12	-	1,981	101	-	122,661	8,760	-

Survey of the Gulf
of Manaar by the
Indian Navy, in
1837.

Continuation by
Mr. Franklin, in
1839.

20. But with the view of rendering these operations as beneficial as possible, the survey of the Gulf of Mannar, on the south side of the pass, and of Palk's Bay or Straits, as it was formerly termed, on the north, was undertaken in 1837 by an expedition furnished by the Bombay Government, consisting of the "Royal Tiger," Lieutenant Powell, the "Shannon," Lieutenant Ethersey, with the tenders "Maldiva" and "Cardive," and a strong corps of mates and midshipmen as assistants. They arrived at the scene of their operations in the latter part of that year, and carried on their labours according as the seasons permitted, till April 1839, when the exigencies of the service required of the Indian Navy in the Persian Gulf and on the coast of Scinde, compelled the Governor-general, very reluctantly, to sanction their return to Bombay, leaving their task incomplete. Mr. Franklin, the present secretary to the Marine Board, was then appointed, with one assistant, to continue the work, and having, after considerable delay, occasioned by the difficulty in procuring a vessel fit for the service, engaged a small country craft of (60) sixty tons, commenced his labours in the month of October following, and continued so employed till the close of 1845, when the survey of both bays, from Cape Comorin to Point Calimere, in India, and from Point de Galle to Point Pedro, in Ceylon, was brought to a conclusion. The charts of the Indian coast, with sheets of the Paumbem Pass and Tuticorin Roads and Harbour, have already been published. Those of the Ceylon side are in the course of preparation.

21. The whole of the Indian side of this survey has been based in Colonel Lambton's triangulation, as far as the principal points are concerned, although so much discrepance was found in working out the details, that the intermediate coast-lines and position of the islands, according to the marine survey, were adopted.

22. The Ceylon side of the Manaar Gulf was fixed from the meridians of Galle and Colombo, and that side of Palk's Bay from the meridian of Paumbem.

23. The commencement of this survey having been carried on by vessels of the Indian Navy, with which this Government in no way interfered, except to afford such assistance in the way of money or supplies as was needed, the Bombay Government will of course furnish full details of the vessels and officers so employed, and the expense of their maintenance. The following statement exhibits similar information respecting the establishment entertained after their recall :—

	Rs.	as.	p.	Rs.	as.	p.
1839 :						
One marine surveyor, from 12th April to 31st December, at 500rs. - - - - -	4,316	10	8			
One officer, from 27th April to 31st December, at 100rs. -	813	5	4			
One draftsman, from 19th April to 15th May, at 25rs. -	22	8	-			
Hire of a vessel of 60 tons, from 18th August to 31st December, at 200rs. - - - - -	893	5	4			
Wages and provisions of crew, from 2d August to 31st December - - - - -	1,386	11	4			
Incidental expenses, from 2d August to 31st December -	384	3	-			
				7,816	12	-
1840 :						
One marine surveyor, from 1st January to 31st December, at 500rs. - - - - -	6,000	-	-			
One officer, from 1st January to 31st December, at 100rs. -	1,200	-	-			
Hire of a vessel of 60 tons, from 1st January to 31st August, at 200rs. - - - - -	1,600	-	-			
Hire of a vessel of 45 tons, from 1st September to 31st December, at 200rs. - - - - -	800	-	-			
Hire of a tender, from 18th March to 31st December, at 50rs. - - - - -	473	4	2			
Wages and provisions of crew, from 1st January to 31st December - - - - -	2,980	1	3			
Incidental expenses, from 1st January to 31st December -	1,142	13	9			
				14,196	3	2

1841:	Rs.	as.	p.	Rs.	as.	p.
One marine surveyor, from 1st January to 31st December, during which two months was on half-pay, at 500rs. -	5,500	-	-			
One officer, from 1st January to 31st December, at 100rs. -	1,200	-	-			
One ditto, from 14th July to 31st December, at 100rs. -	558	1	-			
Messing allowance for two officers, from 14th July to 31st December, at 22rs. 8as. each - - - -	251	2	1			
Hire of a vessel of 45 tons, from the 1st January to 31st December, at 200rs. - - - - -	2,400	-	-			
Hire of tender of 10 tons, from 1st January to 31st December, at 50rs. - - - - -	600	-	-			
Wages and provisions of crew, from 1st January to 31st December - - - - -	3,378	12	8			
Incidental expenses, from 1st January to 31st December -	1,274	7	2			
Surveying instruments - - - - -	545	-	-			
				15,707	6	11
1842:						
One marine surveyor, from 1st January to 31st December, at 500rs. - - - - -	6,000	-	-			
One officer, inclusive of mess money, from 1st January to 31st December, 122rs. 8as. - - - - -	1,470	-	-			
One officer, inclusive of mess money, from 1st January to 30th June, at 122rs. 8as. - - - - -	735	-	-			
One officer, inclusive of mess money, from 1st September to 31st December, at 122rs. 8as. - - - - -	490	-	-			
One draftsman, from 6th July to 31st December, at 35rs. -	204	5	8			
Hire of a vessel of 45 tons, from 1st January to 31st December, at 200rs. - - - - -	2,400	-	-			
Hire of tender of 10 tons, from 1st January to 31st December, at 50rs. - - - - -	600	-	-			
Wages and provisions of crew, from 1st January to 31st December - - - - -	3,850	10	3			
Incidental expenses, from 1st January to 31st December -	1,578	15	11			
Surveying instruments - - - - -	150	-	-			
				17,478	15	10
1843:						
One marine surveyor, from 1st January to 31st December, at 500rs. - - - - -	6,000	-	-			
Two officers, from 1st January to 31st December, at 122rs. 8as. - - - - -	2,940	-	-			
One draftsman, from 1st January to 31st December, at 35rs. - - - - -	420	-	-			
Hire of a vessel of 45 tons, from 1st January to 31st December, at 200rs. - - - - -	2,400	-	-			
Hire of a tender of 10 tons, from 1st January to 31st December, at 50rs. - - - - -	600	-	-			
Wages and provisions of crew, from 1st January to 31st December - - - - -	4,367	5	3			
Incidental expenses, from 1st January to 31st December -	1,718	10	11			
				18,446	-	2
1844:						
One marine surveyor, from 1st January to 31st December, at 500rs. - - - - -	6,000	-	-			
Two officers, from 1st January to 31st December, at 122rs. 8as. - - - - -	2,940	-	-			
One draftsman, from 1st January to 31st December, at 35rs. - - - - -	420	-	-			
Hire of a vessel of 45 tons, from 1st to 31st January, at 200rs. - - - - -	200	-	-			
Hire of a vessel of 80 tons, from 1st February to 31st December, at 200rs. - - - - -	2,200	-	-			
Hire of a tender of 10 tons, from 1st January to 31st December, at 50rs. - - - - -	600	-	-			
Wages and provisions of crew, from 1st January to 31st December - - - - -	4,515	4	1			
Incidental expenses, from 1st January to 31st December -	1,593	9	6			
Surveying instruments - - - - -	187	8	-			
				18,656	5	7

(continued)

1845:	Rs.	as.	p.	Rs.	as.	p.
One marine surveyor, from 1st January to 31st December, at 500 rs. - - - - -	6,000	-	-			
Two officers, from 1st January to 31st December, at 122 rs. 8 as. - - - - -	2,940	-	-			
One draftsman, from 1st January to 28th February, at 35 rs. - - - - -	70	-	-			
Hire of a vessel of 80 tons, from 1st January to 31st December, at 200 rs. - - - - -	2,400	-	-			
Hire of a tender of 10 tons, from 1st January to 22d December, at 50 rs. - - - - -	585	8	-			
Wages and provisions of crew, from 1st January to 31st December - - - - -	4,705	12	2			
Incidental expenses, from 1st January to 31st December -	968	4	3			
				17,669	8	5
1846:						
One marine surveyor, from 1st January to 2d February, at 500 rs. - - - - -	535	11	3			
Two officers, from 1st to 3d January, at 122 rs. 8 as. -	245	-	-			
Hire of a vessel of 80 tons, from 1st to 8th January, at 200 rs. - - - - -	51	9	9			
Wages and provisions of crew, from 1st to 8th January -	93	6	8			
Incidental expenses, from 1st to 8th January - - -	791	1	2			
				1,716	12	10
Company's Rupees - - -				1,11,688	-	11

24. The expenditure above shown was further augmented by the pay and table-money of an assistant apothecary detached from the southern division of the army to do duty with the establishment; his allowances, however, were drawn in the military department.

Survey from Santopilly Rocks to Ennore, by Lieut. Fell, I. N.

25. The third and last survey undertaken on the coasts of this Presidency is that just completed by Lieutenant Fell, of the Indian Navy, in command of the Honourable Company's brig "Krishna." This officer was under the orders of the Bengal Government; and as in the case of those first engaged on the survey last described, the authorities at Fort St. George abstained from all interference with his operations, merely affording such available assistance in the supply of boats, batta, Lascars, &c. as he required. It will only be necessary therefore to state, that it was commenced in February 1846, at the recommendation of the Marine Board, with the view of determining with greater accuracy than was then ascertained, the nature and position of the various dangers with which the navigation of the coast was beset between Ennore and the Santopilly Rocks, the extent to which the work was carried, and that Lieutenant Fell completed his labours in March of the present year 1848. He has been directed to base his charts on Colonel Lambton's triangulation, and it is expected that they will be ready in a short time to transmit to England for publication.

Portion of Coast unsurveyed.

Captain D. Ross's examination of the Malabar Coast in 1824.

26. The portion of the Coromandel Coast remaining unsurveyed is therefore from the Santopilly rocks to the northern point of the Ganjam district on the north, the limit of Captain Lloyd's survey of the head of the Bay of Bengal; and on the south from Ennore to Point Calimere; but as along this extent there are no dangers which are not laid down in the existing charts with sufficient accuracy for the purposes of general navigation, it does not appear to be necessary at present to have them surveyed. Captain Ross, the present Master-attendant at Bombay, was engaged in 1824 in examining the Malabar Coast, but of what nature this examination was, whether a minute survey, or merely the determination of the principal points on the coast, the Board are unable to state, the whole conduct of the operations having been undertaken by and under the direction of the Bombay Government.

LIGHTS OF THE MADRAS PRESIDENCY.

27. The lights on the coast of this Presidency are eleven, four of which are exhibited from regular constructed lighthouses, six from flag-staves, on which the lanterns are hoisted at various elevations according to circumstances; and the remaining one (at Tuticorin) is placed on the summit of an old obelisk, built in former years by the Dutch, eligibly situated on an island, between two and three miles to seaward of the town, and which has always served as an useful landmark for vessels approaching that part of the coast.

Number of Lights.

28. Besides these, there are also two lights which have been proposed by the Master-attendant at Madras during the last two years, recommended by the Marine Board, and sanctioned by Government. They are in course of preparation, although it is feared that a considerable time may elapse before their completion, owing to the paucity of engineer officers available to superintend their construction. No application has been submitted to the Marine Board for exhibiting a light which has not been brought to the favourable notice of Government and sanctioned; the only circumstance that may be considered as an exception to this being a proposition emanating from Lieutenant Fell of the Indian Navy, lately employed in surveying the Coromandel Coast. This officer advised the substitution of Pulicat as the site for a light in lieu of Moonapolium, which had been previously selected as the most eligible spot from which to show a light to warn mariners of the vicinity of the shoalest part of the Armegon Bank, which, five miles due east of this position, has a depth of only ($1\frac{3}{4}$) one fathom and three-quarters over it, with five to six fathoms inside. Pulicat, off which the shoal water extends but ($3\frac{1}{2}$) three and a half miles, is only (20) twenty miles from the Madras light, which can be seen from the deck of a ship of ordinary size at about that distance, and from the mast-head at nearly (30) thirty miles. The Marine Board were therefore not disposed to yield their support to a proposition that would have placed a second light within visible distance of the one at Madras, and leave the most dangerous part of the Armegon Shoal unattended to.

Proposed Lights under construction.

Lieutenant Fell's proposition for a Light at Pulicat.

29. Commencing from the northern part of the Coromandel Coast, and proceeding round by Cape Comorin to the limit of the sea-board of the Presidency on that of Malabar, the following is a serial list and description of the several lights exhibited and proposed, with such information relative to their origin, construction, and management, as appears necessary to enable the Honourable Court of Directors to comply with the requisitions of the Honourable the House of Commons of the 10th February last.

30. With respect to the general results that have followed the improvements in lighting up the coasts of this Presidency, there cannot be a divided opinion. Vessels are navigated with greater safety, and from the exhibition of harbour lights can make their ports at any hour of the night, without fear of overshooting their distance, an advantage not to be lightly appreciated in a country where the monsoons render it difficult and occasionally impossible to beat to windward. Some wrecks have lately occurred to the northward, and one at Covelong, within sight of the Madras light; but with the exception of the brig "Montefiore," which parted from two anchors in a heavy breeze at Monsoorcottah, their loss can be attributed to nothing else than inattention on the part of their commanders to the usual precautions taken when near land, and not in any way connected with the dangers of the coast. To render this intelligible, it will be sufficient to say that they all ran on shore on the beach in fine weather.

I.—Santapilly Light.

Latitude, $18^{\circ} 1''$ N.; Longitude, $83^{\circ} 39''$ E.*

* Indian Atlas.

31. The importance of a light in the vicinity of the Santapilly Rocks was first brought to notice by Captain Biden in September 1846, on his return from an examination of that locality in the "Hugh Lindsay." These rocks are stated by him to be between five and six miles from the shore, about ten feet under water, with eight to ten fathoms all round, and in fine weather do not present any appearance of breaking. So little is their danger apparent, that Lieutenant Hill, when about to survey them, anchored his vessel within a hundred yards

without perceiving them, although a good look-out was kept for this express purpose. The spot best adapted for the erection of a light as a beacon for their avoidance, appeared to be on the northern and lesser of the two Conara Hills, which is within half a mile of the beach, and is nearly abreast of the rocks; and as it is about (150) one hundred and fifty feet above the level of the sea, no lofty structure is needed to increase the height of the light. The following recommendation was therefore submitted by the Marine Board to Government and sanctioned.

32. That a light with two reflectors be exhibited from a platform on the little Conara Hill, under the charge of a superintendent and five Lascars, for whose accommodation a building should be erected in its immediate vicinity, the whole to be completed at an estimated cost of rupees (1,498. 15.) one thousand four hundred and ninety-eight, and annas fifteen. The light will be visible at a distance of about 15 miles in ordinary weather, and the monthly cost of its maintenance, which has received the sanction of the Supreme Government, will be as follows:—

						Rs.	Rs.	as.	p.
1	Superintendent	-	-	-	-	52	52	-	-
1	Tindal	-	-	-	-	6	6	-	-
4	Lascars	-	-	-	-	5	22	-	-
116½	Viss of oil	-	-	-	-	about	46	7	4
	Cotton wick	-	-	-	-	about	1	2	8
Company's Rupees						-	127	10	-

II.—Coringa Light.

Indian Atlas.

Latitude, 16° 49' 5" N.; Longitude, 82° 22' 40" E. Distant from the proposed Santopilly Light S. 45° W. 103 Miles.

33. The proposal for the exhibition of this light emanated from the Marine Board in 1813; and on the recommendation of the officer then holding the appointment of Master-attendant at Coringa, Hope Island was selected as the position it should occupy. It was originally intended to have been placed on a mast, but subsequently in 1816, before the work was undertaken, the erection of a tower was determined on, and carried into effect soon after. The light was composed of ten wicks, placed in common tumblers arranged in a line, was (66) sixty-six feet above the level of the sea, and was visible, when properly attended to, at about (12) twelve miles distance.

34. In this condition the light remained till 1833, when it appears some discussion arose regarding the expediency of improving it. Lieutenant (now Major) Smith of the Engineers proposed that the illuminating power should be increased by substituting fifteen Argand lamps arranged in three circular tiers for the ten common ones then in use, and at the same time advised the introduction of certain alterations in the light-room for the better and freer supply of atmospheric air. These measures being at once sanctioned, the construction of a new lantern on the principles recommended was commenced, and after the old one had been consumed by fire in June 1834, was placed in its position in October or November of the same year. The brilliancy of the light was of course now considerably augmented, but unfortunately the internal heat was found to be so intense that the copper of the lamps actually fused; and the light-room continued so hot even when the number of burners employed was reduced to the minimum at which it was considered advisable to bring them, that the attendants had some difficulty in entering to perform their duties of trimming, &c. In August 1836, therefore, the construction of a new and larger lantern was sanctioned, but it does not appear that it was supplied before the hurricane which devastated that part of the country on the 16th and 17th November 1839, and which injured the building to such an extent as to preclude all possibility of exhibiting the light for some time.

35. The

35. The necessary repairs were immediately commenced, and were so advanced by the 3d of December following, that the light was again in operation at that date, and has continued so till the present time, with only two short interruptions in the early parts of 1840 and 1843, during which certain slight repairs and alterations were in course of execution ; the latter consisting of the substitution of a light frame-work and large frames of plate glass round the light room for the ponderous and ineffective windows that were before in use.

36. As now conducted, the Coringa light burns nine argand lamps, whose power is increased by parabolic reflectors. Its height is (66) sixty-six feet above the sea level, and it is visible in clear weather at a distance of about fifteen miles. The following sketch exhibits the estimated and actual expenditure for its maintenance, the charge of the establishment being vested in the Master-attendant at Cocanada, from which port the light is distant (6) six miles.

							Sanctioned Estimate.	Actual Expenditure.
							<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
1 Superintendent	-	-	-	-	-	at 52	52 - -	52 - -
1 Tindal	}	-	-	-	-	„ 5	27 8 -	27 8 -
4 Lascars		-	-	-	-	„ 1	1 - -	1 - -
1 Washerman for cloths		-	-	-	-	„ 1	1 - -	1 - -
270 lbs. Oil	-	-	-	-	-	-	28 - -	45 9 7
Wick	-	-	-	-	-	-	1 12 10	- 13 4
Contingent charges	-	-	-	-	-	-	- - -	- 13 8
Company's Rupees							110 4 10	127 12 7

III.—Masulipatam Light.

Latitude, 16° 9' 30" N.; Longitude, 81° 12' 45" E. Distant from the Coringa Indian Atlas. Light S. 72°, W. 131 Miles.

37. A new lantern for the use of the Madras light being expected from England, Captain Clarence Dalrymple in 1837, then Master-attendant at Madras, proposed, with the view of lessening the frequency of the wrecks which he observes had occurred of late years between Masulipatam and Coringa, that the old apparatus should be made available for the exhibition of a light at Point Divi, the easternmost point of land near the mouths of the Kistna, where he considered that its utility to general navigation would be most conspicuously felt. Both the collector of the district and the civil engineer of the division were, however, impressed in favour of False Point, at the principal mouth of the river, as being a far more eligible position ; Point Divi being very low, and the soil not sufficiently firm to afford a substantial foundation for the erection of a tower, although they subsequently stated that a flagstaff might be raised there. The Marine Board adopted Captain Dalrymple's view of the matter, but eventually, owing to the difficulties that presented themselves to the accomplishment of their original plans, and the evident inutility to general navigation of a light twenty miles west of the outer point of the coast, which it would have been had the suggestion of the collector and civil engineer been attended to, the sanction of Government was procured for its being exhibited from the Masulipatam flagstaff, which is situated about a mile from the beach on the south-eastern or sea-face of the fort. The propriety of placing another light at False Point was then discussed, but negatived by the Board until at least the result of that at Masulipatam had been shown. Ultimately it was considered unnecessary.

38. The old Madras light apparatus neither being available nor fit for the flagstaff, a two-reflector lantern was constructed in the arsenal, and on the 1st December 1840 the light was exhibited, and has continued so ever since, with but few interruptions for occasional repairs, to obviate which a duplicate was furnished

furnished in April 1846. Its height above the sea level is about (95) ninety-five feet, and it is visible from the deck of a vessel about twelve or thirteen miles. It is placed under the charge of the Master-attendant at the port, who is allowed an establishment of three men for its management, the monthly cost of maintenance being as follows :—

						Rs.	Rs.	as.	p.	
1 Head Man	-	-	-	-	at 10	10	-	-		Expenditure as sanctioned.
2 Lascars	-	-	-	-	„ 7	14	-	-		
240 lbs. Oil	-	-	-	-	-	27	13	8		
Wick	-	-	-	-	-	-	9	6		
Company's Rupees	-	-	-	-	-	52	7	2		

39. In September 1846 Captain Biden having visited the spot again, revived the abandoned idea of establishing the light at Divi, pointing out the advantage that must arise from its being placed on the most prominent part of the coast; Masulipatam being ten miles inside a line connecting the Divi and Narsipoor points, and the light there being of no service to any vessels but such as were bound to the port. The sanction of Government for the new site was thereon solicited and obtained, and a flagstaff is now ordered to be erected at the point, to which on its completion the lantern will be transferred.

Indian Atlas.

40. The new position of the light will be about latitude $15^{\circ} 57' 30''$ N., and longitude $81^{\circ} 14' 5''$ E.; S. 51, W. 81 miles from Coringa light.

IV.—*Armegon Light.*

Lieutenant Fell's
survey taking the
longitude of Madras
from the Indian
Atlas.

Latitude, $13^{\circ} 53' N.$; Longitude, $80^{\circ} 16' E.$ Distant from Point Divi proposed Light, S. 24° , W. 186 Miles.

41. It was during a visit to the northern ports in September 1846, undertaken in the H. C. steamer "Hugh Lindsay," which vessel had shortly before been transferred from the Bombay Government to that of Madras, that Captain Biden perceived the necessity of introducing those improvements in the lighting of the Coromandel Coast that have already been noticed as emanating from his suggestions. He also drew attention to the peculiar dangers that beset the navigator on this coast, from the indraught so frequently and fatally experienced in the vicinity of the Armegon and Pulicat Shoals, on the former of which a patch of hard sand, with a depth over it of only ten and a half feet, is situated five miles from the shore. Some vessels had been wrecked, and many others placed in most hazardous positions from the influence of this indraught; and even since this period, no less than four vessels have been stranded and totally lost during fine weather, owing to the current having in each instance carried them considerably to the westward of their reckoning, although it must at the same time be admitted, that had a proper look-out been kept the accidents would not have occurred.

42. These observations and suggestions have been duly taken into consideration by the Marine Board; they addressed Government on the subject, and obtained sanction for the erection of a lighthouse at the village of Moonapolium, due west of the shoal spot before noticed. The estimated expense of the building is not yet ascertained, as the plans originally submitted have to undergo some modification, but it will probably not exceed (5 or 6,000) five or six thousand rupees.

The sanctioned monthly cost of the maintenance of the light is—

										<i>Rs.</i>	<i>Rs.</i>	<i>as.</i>	<i>p.</i>		
1 Superintendent	-	-	-	-	-	-	-	-	-	at 52	52	-	-		
3 Lascars	-	-	-	-	-	-	-	-	-	„ 7	21	-	-		
Oil	-	-	-	-	-	-	-	-	-	-	15	-	-		
Wick, &c.	-	-	-	-	-	-	-	-	-	-	5	-	-		
Company's Rupees										-	-	-	93	-	-

V.—*Madras Light.*

Latitude, $13^{\circ} 5' 10''$ N.; Longitude, $80^{\circ} 20' 44''$ E. Distant from the proposed Indian Atlas.
 Armegon light, S. 5° , E. 48 Miles.

43. The Madras light was for a very considerable time exhibited on a frame-work or scaffolding raised on the roof of the commercial exchange in the fort. The height above the sea level was about (100) one hundred feet, and it ought to have been visible at a distance of about (17) seventeen miles, but the principle of illumination was of a most primitive description. Twelve wicks were placed in common finger glasses and small country mirrors used as reflectors. It was hardly to be expected that a brilliant light could be produced by such means, and in 1834 Vice-Admiral Sir John Gore, the naval commander-in-chief in the East Indies, having brought to the notice of Government its inefficiency as regarded height, intensity, and position, it was resolved that measures should be taken for its improvement. To this end a communication on the subject was opened between the Marine Board and Captain (now Major) Smith of the Engineers, who being on the point of proceeding to England, expressed his readiness to institute all necessary inquiries, and ascertain the best means of carrying into effect the contemplated alterations; and finally the Honourable Court of Directors sanctioned, at a cost of (£. 1,500.) one thousand and five hundred pounds, the construction under his superintendence of an apparatus in which the reciprocating principle was introduced in lieu of the ordinary rotary motion, a plan then first suggested by himself.

The Indian Atlas places the Madras Observatory in longitude $80^{\circ} 18' 30''$ E, but this has been corrected by the late Mr. Taylor, H. Co.'s astronomer, to $80^{\circ} 14' 15''$. All the longitudes mentioned as being taken from the Indian Atlas requires therefore a correction of $4' 15''$.

The difference of longitude between the observatory and lighthouse is $2' 14''$.

44. In December 1837 this apparatus was brought out by Captain Smith, and as the old frame-work on which the light had hitherto been placed was in a decayed condition, and had been pronounced by such high authority as Sir John Gore, as well as by the Master-attendant, as too far to the south of the anchorage to be of the utility to the shipping that it might be if better placed, and moreover, that it was not of sufficient height, it became a matter of consideration whether it would not be advisable to incur the expense of a new building to be erected in a more eligible site for its reception.

45. A position was accordingly selected on the esplanade between the fort and the office of Messrs. Parry & Co., and the sanction of the Honourable Court having been received, a granite column was commenced in August 1838, under the direction of the talented officer who had been entrusted with the construction of that part of the work already executed, and was completed in December 1843, to such extent as to allow of the light being exhibited on the 1st of January following, timely notice of which was published in the English and vernacular languages.

46. The peculiar and delicate construction of the machinery rendered it necessary, not only that considerable care and attention should be bestowed on its management, but that its superintendence should be vested in some one practically versed in mechanics, and able to provide against any little obstacles that might oppose its free action. The whole establishment was therefore placed under the control of Captain Smith, who retained charge until the attendants had acquired a competent knowledge of their duties, and it was not till the 6th of October 1845 that it was transferred to the Master-attendant, under whom it has ever since remained.

47. The light is of the flashing description, the ratio of the flashes to the eclipses being in the proportion of two to three, although their actual duration is altered according to the position of the spectators. The means of illumination are afforded by fifteen argand lamps with parabolic reflectors, constructed on the latest and most improved principles, which are arranged in three tiers, and the area illumined comprehends (24) twenty-four points of the compass, being nearly (130) one hundred and thirty feet above the mean level of the sea; it is visible from the deck of a ship at a distance of about (20) twenty miles, and from the mast-head nearly (30) thirty, its brilliancy allowing it to be seen until shut out from view by the earth's convexity, and from the testimony of all who have visited the port, it may without exaggeration be pronounced the best in India.

48. The monthly cost of the maintenance of the Madras light is as follows :

	Rs.	as.	Rs.	as.	p.	
1 Superintendent	-	-	-	-	-	70 -
1 Deputy	-	-	-	-	-	21 -
1 Headman	-	-	-	-	-	9 -
1 Lascar	-	-	-	-	-	8 -
1 Ditto	-	-	-	-	-	7 -
1 Ditto	-	-	-	-	-	6 8
1 Ditto	-	-	-	-	-	6 -
1 Ditto	-	-	-	-	-	5 8
208 Measures of oil	-	-	-	-	-	91 -
Contingent charges	-	-	-	-	-	3 3
Company's Rupees						227 3 -

Expenditure as sanctioned.

To this must be added the cost of spare articles from England, such as burners, chimnies, &c.

Pondicherry Light.

M. Holstein, the
Capitaine de Port
at Pondicherry.

Latitude, 11° 55' 57" N.* ; Longitude, 79° 53' 33" E. Distant from the Madras Light S. 17°, W. 72 Miles.

49. This light is exhibited from the summit of a column of masonry at a height of (95) ninety-five feet above the sea level, and is visible in clear weather at about (18) eighteen miles distant. It is a fixed light and burns of a pale colour, the means of illumination consisting of six burners and reflectors disposed in an horizontal semicircle facing the sea. It was first exhibited on the 1st July 1836.

VI.—*Negapatam Light.*

Horsburgh;
Edition of 1846.

Latitude, 10° 45' 36" ; Longitude, 79° 55'. Distant from Pondicherry Light, S. 71 Miles.

50. As the facilities of the passage through the Paumbem channels became developed, so was the trade of the port of Negapatam proportionally augmented, the principal exports being grain and cotton cloths to Colombo and other ports in Ceylon. In the early part of 1845, the native merchants feeling the want of a light to indicate their port, which is not easily discovered during the night, subscribed a sum of (250) two hundred and fifty rupees to defray the expense of a small lantern, such as had been supplied during the few previous years to the ports on the Malabar Coast, and addressed the Collector of Tanjore, with the view of procuring the exhibition of a light from the port flagstaff. After due inquiries had been made, a proposition to this effect was submitted by the Marine Board to Government, who immediately concurred in its propriety, and resolved that the State should bear all the attendant expenses. Two lanterns, one the duplicate of the other, having been furnished, and the flagstaff put into thorough repair, the light was exhibited on the 1st of August 1846, at a height of (100) one hundred feet above the level of the sea, visible from the deck of a ship at a distance of about eleven or twelve miles, which however is diminished to something less during the N. E. monsoon, when the violence of the wind renders it advisable not to hoist the lantern above the cap of the lower mast when it is but (88) eighty-eight feet above the sea level.

51. The lanterns are fitted with two burners each and parabolic reflectors.

52. The establishment is placed under the charge of the collector of the district, and the cost of its maintenance is as follows :

	Rs.	Rs.	as.	p.	
2 Lascars	-	-	-	-	10 - -
60 Viss of oil	-	-	-	-	15 - -
Wick, &c.	-	-	-	-	5 - -
Company's Rupees					30 - -

Expenditure
as
sanctioned.

VII.—*Paumbem Light.*

Latitude, 9° 17' 30" N.; Longitude, 79° 15' 40" E. Distant from Point Calimere, Powell's Survey. S. 33°, W. 72 Miles.

53. The operations for deepening the passage between India and the Island of Ramisseram having naturally added stimulus to the trade between the ports on the opposite sides of the channel, it became a matter of consideration in 1842, whether it would not be advisable to exhibit a light at or near Paumbem. In a channel narrow, shallow and tortuous as the one undergoing improvement, it was impossible to place the light in such wise as to assist craft in passing through after dark. The principal desideratum was a beacon to afford facility to vessels approaching the port during the night, and to enable those coming from the northward to select during the N. E. monsoon convenient berths, whence they could by daylight weigh without danger, and proceed through. With this object in view, proposition was made to Government by the Marine Board, and sanction obtained in the latter part of 1842, for the erection, on a hill about a mile east of the northern channel, of a column from which to exhibit a light. In August 1843, the building was commenced under the superintendence of the late Lieutenant Robertson, the officer then in charge of the operations for deepening the channels, and on the 21st April 1846, the light was first shown. The lantern placed (84) eighty-four feet above the level of the sea, is composed of four burners, with parabolic reflectors arranged at right angles to each other, so as to direct the rays of light to all points of the compass, and it is visible from the deck of a small craft, at a distance of about ten or eleven miles.

Madras Observatory being considered to be in longitude 80° 17' 21" E., which being 3' 6" to the east of the position assigned by Mr. Taylor, a correction equal to the latter amount should be subtracted from all longitudes given in the Manaar survey by either Lieutenant Powell or Mr. Franklin.

54. The control of the establishment is vested in the office for the time being in charge of the engineering operations, who exercises a general supervision over the affairs of the port.

55. The monthly cost of maintenance is —

	Sanctioned Expenditure.	Actual Expenditure.
	Rs. as. p.	Rs. as. p.
2 Lascars - - - - - 6	12 - -	12 - -
60 $\frac{3}{4}$ Gallons of oil - - - - - 1	60 13 4	60 13 4
Contingent charges - - - - - -	5 - -	5 - -
Wick, &c. - - - - - -	4 2 8	2 7 10
Company's Rupees - - - - -	82 - -	80 5 2

VIII.—*Tutacorin Light.*

Latitude, 8° 47' 17" N.; Longitude, 78° 14' 1" E. Distant from Cape Comorin, N. 46° E. 60 Miles. Distant from Colombo, N. 42°, W. 149 Miles.

Franklin's Survey Allowance Madras Observatory to be in 80° 17' 21" E.

56. The advantage of establishing a light at the port of Tutacorin was brought to the notice of Government in June 1843, by Mr. Franklin, then employed in the survey of the Manaar Gulf. The trade of the port having considerably increased as the facilities of its approach and the safety of its anchorage became known, the proposition was favourably received; and on the 15th May 1845, a lantern having three burners, with parabolic reflectors, was placed on a platform raised on an old Dutch obelisk, on Hare Island, situated about (2½) two and a half miles east of the town of Tutacorin, and a-breast of the safest anchoring-ground

ground for ships. The light is about (50) fifty feet above the level of the sea, and is visible from the deck of a ship about (10) ten miles off.

57. One great advantage secured by this light is, that during the S. W. monsoon, when vessels in the Colombo Roads frequently drag or part their anchors, they can stand across the gulf, and make Tutacorin during the night, where, although blowing hard, they are on a weather shore and in smooth water, and can anchor without the slightest risk of danger.

58. A fresh lantern is under construction to replace that now in use, in which the reflectors will be so arranged that (17) seventeen points of the horizon will be included in the arc of illumination.

59. The cost of maintenance is as follows :

	Rs.	Rs.	as.	p.	
1 Superintending Lascar - - - - -	-	9	-	-	} Expenditure as sanctioned.
4 Lascars - - - - -	6	24	-	-	
60 Viss of oil - - - - -	-	17	8	-	
Wicks, &c. - - - - -	-	2	-	-	
Company's Rupees - - - - -	-	52	8	-	

IX.—Cochin Light.

Indian Atlas.

Latitude, 9° 58' 5" N.; Longitude, 76° 18' 10' E. Distant from Cape Comorin, N. 34°, W. 136 Miles.

60. The entrance to the back-water at Cochin had been for some time marked by two buoys, but it appears that great difficulty was experienced, and considerable expense incurred, in preserving them in their position; they were also reported by the individual then holding the appointment of Master-attendant at that port, to be of very little service. It was therefore proposed to Government by the Marine Board in the latter part of 1837, that these bouys should be removed, and that in lieu, a light, such as had been shortly before supplied for the port of Tellicherry, should be exhibited from the Cochin flagstaff. The measure was immediately sanctioned, and on the 1st of April 1839 it was shown at an elevation of (114) one hundred and fourteen feet above the level of the sea, visible at a distance of about ten or eleven miles. The lantern consisted of one burner, with a concave metal reflector, constructed so as to give light a lateral range of sixteen points, being the entire seaward arc of the horizon.

61. During the S. W. monsoon, the topmast, to the head of which the lantern is hoisted, is struck, when the distance at which the light is visible is reduced to (10) about ten miles, its height above the sea level being then only (62) sixty-two feet.

62. The establishment is under the charge of the Master-attendant, and the monthly cost of maintenance is as follows :

	Rs.	Rs.	as.	p.	
2 Lascars - - - - -	5	10	-	-	} Expenditure as sanctioned.
Oil, cotton, &c. - - - - -	-	5	8	-	
Company's Rupees - - - - -	-	15	8	-	

X.—Calicut Light.

Indian Atlas.

Latitude, 11° 15' 15" N.; Longitude, 75° 49' 50" E. Distant from Cochin Light, N. 25°, W. 74 Miles.

63. This light was first proposed in June 1844, on the application of the merchants of Calicut by the collector of the district, strongly backed by Captain Williams, an officer of the Indian Navy, employed on the coast as agent for the purchase

purchase of Government timber. The necessary preliminaries were all completed, and the exhibition of a light sanctioned, when subsequently in July 1845, it was found that the flagstaff on which it was intended to hoist the lantern was in such a decayed state as to render its immediate removal a matter of safety. It was at first proposed to scarf it, but on inspection it proved to be too far decayed to admit of any repair; and as a laterite column (90) ninety feet high could be constructed at a cost not much exceeding that for which a new flagstaff could be raised, it was finally determined that the former should be erected at an expense of rupees (2,360. 5.) two thousand three hundred and sixty, and annas five. The building was completed by the beginning of 1847, and on the 1st of February of that year, a one-reflector light similar to that supplied to Cochin, was exhibited therefrom, at a height of (105) one hundred and five feet above the level of the sea, visible at a distance of about ten or eleven miles. This light is not shown during the S.W. monsoon, from the 20th May to the 10th August.

64. The establishment is similar to that attached to the Cochin light, and is placed under the superintendence of the Sea Custom Manager, the cost of maintenance being,

							Sanctioned Expenditure.	Actual Expenditure.
							<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
2 Lascars, at	-	-	-	-	-	<i>Rs.</i> 5	10 - -	10 - -
Oil, wick, &c.	-	-	-	-	-	-	5 - -	4 4 -
Company's Rupees							15 - -	14 4 -

XI.—Tellicherry Light.

Latitude, 11° 14' 50" N.; Longitude, 75° 32' 50". Distant from the Calicut Indian Atlas.
Light, N. 30°, W. 35 Miles.

65. The exhibition of a light on the flagstaff at Tellicherry was proposed in October 1834 by the Marine Board, who stated that it was generally regretted by merchant captains visiting the port, that a beacon of some sort was not shown to indicate its position. The proposition met with the immediate and favourable attention of Government, who in December following authorized the measure, and on the 1st of December 1835 all the arrangements having been concluded, the light was in operation. The means of illumination were afforded by one burner, and concave metal reflector, placed at (130) one hundred and thirty feet above the sea level, and visible from all points of the western horizon at a distance of about ten or eleven miles in clear weather.

66. The establishment is placed under the charge of the Master-attendant at the port, and the monthly charge of maintenance was as follows:

							<i>Rs.</i>	<i>Rs. as. p.</i>
2 Lascars, at	-	-	-	-	-	-	5	10 - -
Oil, &c.	-	-	-	-	-	-	-	5 - -
Company's Rupees							-	15 - -

In May 1838, however, it was thought advisable, with the view of distinguishing this from the others, that two lights should be exhibited from the flagstaff, at an interval of twenty to thirty feet, but no alteration was effected at that time.

67. On the 5th March 1845 the lantern, while in the cross-trees, unfortunately caught fire from the carelessness of one of the Massaulchees, who, in wiping the glasses, allowed his cloth to ignite, and before the flames could be extinguished it was entirely consumed, together with the cross-trees and adjacent-

wood-work. An old one which had been ordered to be sold, but for which no bidders were to be found, was immediately put in sufficient repair for the temporary continuance of the light; and to avoid any such accident in future, it was resolved to erect a laterite column close to the flagstaff, which is on one of the bastions of the fort, from which to exhibit the light in future. A sum of rupees (501. 13. 5.) five hundred and one, annas thirteen, and pice five, was sanctioned on this account, and the work was to have been commenced immediately, but on reconsideration, the civil engineer of the district, from whom the proposition had emanated, suggested as an improvement that such portions of the flagstaff and rigging as were from their proximity to the light subject to risk from fire, should be cased with copper, and iron chain used instead of rope, a measure that was at once sanctioned and put into execution. In the meantime fresh lanterns were supplied, and the proposition for distinguishing this beacon from those at Cannanore and Calicut, carried into effect by displaying two; one with two burners at a height of (140) one hundred and forty feet above the level of the sea; the other with one burner, at a height of (104) one hundred and four feet. This alteration dates from the 1st of January 1846, and consequent on the additional duties that thus devolved on the establishment, authority was granted in June 1848 for the entertainment of one more Lascar, the expense of maintenance being now

							<i>Rs.</i>	<i>Rs. as. p.</i>
1 Lascar	-	-	-	-	-	-	6	6 - -
1 „	-	-	-	-	-	-	5	5 - -
1 „	-	-	-	-	-	-	4	4 - -
Oil, &c.	-	-	-	-	-	-	-	5 - -
Company's Rupees - - -								20 - -

XII.—Cannanore Light.

Indian Atlas.

Latitude, $11^{\circ} 51' 30''$ N.; Longitude, $75^{\circ} 26'$ E. Distant from the Tellicherry Light, N. 49° , W. 9 Miles.

68. The exhibition of a light from the flagstaff at this port was first brought under discussion in the latter part of 1842, its purpose being mainly to indicate the anchorage to Her Majesty's colonial steamer "Seaforth," which vessel was to touch there on her passage between Colombo and Bombay with the view of landing and receiving the mails and passengers, and of taking in coals. Tellicherry, at which port a light was already shown, and where there was a Master-attendant, being so near, in fact, at only an hour's steaming distance, it naturally occurred to the Marine Board that the "Seaforth's" touching point might be advantageously transferred to that place, but on inquiry it appeared that many inconveniences would have attended such an arrangement. Cannanore possessed the advantage of being a large military station. The heads of all departments were there located. The mails were closed and shipped at once without the delay of a land journey of twelve or thirteen miles, which would have been necessary if sent on board at Tellicherry, and all the authorities with whom military passengers, the most numerous class, had to communicate were there also. Moreover, the size and convenience of the town itself rendered it far preferable to Tellicherry as the point of embarkation or debarkation. Under all circumstances, therefore, Cannanore continued to be visited by the steamer, and on the 17th October 1843 the light was first shown on the flagstaff from an old lantern transferred from Tellicherry, which in December 1844 was replaced by a new one with a single concave reflector furnished expressly for the port, and a duplicate of which was subsequently supplied. The height of the light above the sea level is about (110) one hundred and ten feet, excepting in the south-west monsoon, when it is lowered to (85) eighty-five, and it is visible from ten to eleven miles in clear weather.

69. There

69. There being no master-attendant or marine establishment at the port, the charge of the light is entrusted to the commissary of ordnance at the station, the monthly cost of maintenance being—

	Rs.	Rs.	as.	p.	
2 Lascars - - -	at 5	10	-	-	} Expenditure as sanctioned.
Oil, &c. - - -	-	10	13	2	
Company's Rupees - - -	-	20	13	2	

XIII.—Mangalore Light.

Latitude, 12° 51'. N.; Longitude, 74° 53' E. Distant from Cannanore Light N. 31°, W. 69 miles. Horsburgh, Edition of 1846.

70. The collector of Canara having noticed that inconvenience was occasioned by the want of a beacon light to indicate the port of Mangalore during the night, represented the circumstance to the Marine Board in the latter part of 1839, and applied for one to be exhibited from the flagstaff, which was situated on a hill (200) two hundred feet above the level of the sea. Sanction was obtained for putting into effect the suggestion thus offered, and since the 1st of October 1842 the light has been shown during the fair weather season, the period of its extinction being, as with that of Calicut, from the 20th May to the 10th August. The lantern supplied for this purpose, of which a duplicate was furnished in October 1846, is fitted with three Argand burners and parabolic reflectors, and the distance at which the light may be discerned is reckoned about (16) sixteen miles.

71. No additional men were required for attendance, as it was found that the two already attached to the flagstaff could without inconvenience be charged with that duty. The monthly expense for oil, &c., is about (15) fifteen rupees, and the superintendence is vested in the sea customs' manager, who has held charge of the Marine department since the abolition of the office of master-attendant.

BEACONS, BUOYS, &c.

72. There are but few beacons or buoys used on the coast of the Madras Presidency, for being possessed of no harbours of depth, and of but few navigable rivers, and those, with the exception of the Godavary at Coringa, and the mouth of the Backwater at Cochin, only available to the smaller description of craft, there occurs but little necessity for them. Among the beacons, however, must be classed the flagstaves, which serve to point out the situation of the various ports at which they are placed. Pursuing the plan adopted in enumerating the lights, the following will be found to comprise a notice of all the buoys and beacons that have been or are about to be established for facilitating the navigation of these coasts :—

Monsoorcottah Flagstaff.

Latitude, 19° 14'. N.; Longitude, 85° 3' E.

Horsburgh, 1846.

73. At this port there was formerly a flagstaff kept up at the expense of the master-attendant, but on the office being abolished in 1837, it appears to have fallen from decay and not again erected. Within the last few years the trade of the port has revived. Extensive sugar plantations have been brought into cultivation in its vicinity, and many English vessels now load there during the year. There are, however, no prominent natural marks by which the anchorage can be distinguished, and the Marine Board, at the suggestion of Captain Biden, recommended the erection of a port flagstaff on a small hill near the beach on which to display an ensign on the approach of a vessel. Sanction has been granted, and for the engagement of a lascar at a monthly salary of seven rupees for its care, and the work is now in the hands of the civil engineer of the division.

74. No signals will be supplied.

Vizagapatam Flagstaff.

Indian Atlas.

Latitude, $17^{\circ} 42' N.$; Longitude, $83^{\circ} 21' 15'' E.$

75. This flagstaff, which has been erected from time immemorial, is situated on a hill south of the port, called the Dolphin Nose, and is under the charge of the officer commanding the garrison, who employs a serjeant and a few lascars to attend to it. These are now about to be withdrawn, but as the staff is too distant from the port to admit of the sea custom gomastah, to whom, on the abolition of the master-attendant office in 1843, the Marine department was made over, taking charge of it in its present position, where it is found extremely useful in pointing out the port, which is shut in from the northward, the Marine Board have recommended that they shall be continued in their duties.

76. In the year 1843, Marryatt's book of signals was supplied, and in 1847, on a representation that inconvenience was experienced from the port not being furnished with the means of signalizing with the shipping in the roadstead, a set of signal-flags was added.

Coringa Flagstaff.

Indian Atlas.

Latitude, $16^{\circ} 56' 25'' N.$; Longitude, $82^{\circ} 17' 40'' E.$

77. The Coringa flagstaff was for many years situated in the town of the same name, but the anchorage becoming gradually more distant as the banks formed by the mud and silt brought down by the Godavery extended, till at last it was only on a clear day that the staff was to be distinguished from the shipping, it was in 1847, under the advice of the collector and the master-attendant at Madras, removed to Juggernaik Poorum, where it is about due west of the ships in the roads.

78. One tindal and one lascar, on the respective monthly salaries of seven and four rupees, are employed in attendance, under the orders of the master-attendant, whose office was removed from Coringa to the same locality in the early part of 1847.

79. Marryatt's code of signals are furnished for the use of the port, and a small boat, manned by two lascars, at a monthly salary of five rupees each, is placed at the disposal of the master-attendant, to board ships on their arrival, and to supply oil, &c., to the lighthouse on Hope Island, which lies about (6) six miles from the port.

Masulipatam Flagstaff.

Indian Atlas.

Latitude, $16^{\circ} 9' N.$; Longitude, $81^{\circ} 12' 45'' E.$

80. This staff is situated on the sea-face of the fort, about one mile from the beach, and is attended to by lascars supplied from the arsenal. It is placed under the charge of the master-attendant, who is also invested with the management of the light which is exhibited from it.

Eskapilly Flagstaff.

Indian Atlas.

Latitude, $14^{\circ} 44' N.$; Longitude, $80^{\circ} 10' 30'' E.$

81. This is a small flagstaff kept up at the port of Eskapilly, under the control of the collector of the district. No establishment is allowed in the Marine department for its attendance.

Pulicat Flagstaff.

Indian Atlas.

Latitude, $13^{\circ} 35' 15'' N.$; Longitude, $80^{\circ} 23' 40'' E.$

82. This staff was formerly under the charge of the master-attendant of the port, but the office being abolished in 1837, the control of the Marine department was placed in the hands of the police ameen, who receives on this account an addition to his salary of (30) thirty rupees per month, and deputes two lascars to attend to the duties of the staff.

83. He

83. He is at present supplied with a code of Marryatt's signals, but as very few vessels, either European or native, visit the place, it is not in contemplation to renew them on their becoming unserviceable.

Madras Flagstaves.

Master-attendant's, Latitude, $13^{\circ} 6' N.$; Longitude, $80^{\circ} 21' 55'' E.$

Indian Atlas.

Fort - - - - - , , $13^{\circ} 5' N.$; Longitude, $80^{\circ} 21' 45'' E.$

84. At Madras there are two flagstaves; one placed at the master-attendant's office on the north beach, from which all signals with the shipping are made and returned, the other on the sea-face of the Fort, under the charge of the town-major. Two signal-men are employed, at a monthly salary of (10) ten rupees each to attend to the former, while the latter is managed by men supplied by the officer under whose control it is placed.

85. The establishment kept up for the service of the port is one Masulah boat, with a crew of a tindal, ten men and a boy, employed in taking the master-attendant or his assistant afloat when necessary. Eight catamaran men, whose duties are to board ships coming into the Roads for their report, ascertain the depth of water in which they anchor, and otherwise carry orders. Two divers and six large catamaran men employed recovering anchors or other articles that may have been lost overboard, the salvage of which is credited to Government with the exception of (5) five per cent. on claimed, and ($2\frac{1}{2}$) two and-a-half per cent. on the proceeds of unclaimed articles, which is distributed to the establishment. The whole is superintended by a native overseer and deputy.

86. In 1834 a company was formed to carry into effect a proposition that had long occupied the attention of the community, namely, the building a breakwater within a moderate distance of the shore, with the view of facilitating the landing and shipment of cargo, which so frequently received damage in passing through the surf, proverbially known to break with violence on the Madras beach. The work was commenced in 1835, and a large quantity of granite was sunk in (26) twenty-six feet water abreast the master-attendant and sea custom offices, but after proceeding for a time it was found that the expenditure would be so infinitely beyond all the calculations, that the idea was abandoned. A danger, however, had now been formed, for the mount of granite rose from four fathoms to within twelve feet of the surface. A buoy has consequently been placed on the southern edge as a warning to ships, and more particularly to small craft, not to approach too close. The bearings of the breakwater from the master-attendant's flagstaff are S. E. by E. $\frac{3}{4}$ E. (300) three hundred yards from the shore. Extreme length from N.N.E. to S.S.W. (76) seventy-six feet. Extreme breadth (55) fifty-five feet.

Pondicherry Flagstaff (French).

Latitude, $11^{\circ} 55' 57'' N.$; Longitude, $79^{\circ} 53' 33'' E.$

From M. Holstein.
Capt. department.

87. This flagstaff is erected on the beach close to the lighthouse.

Cuddalore Flagstaff.

Latitude, $11^{\circ} 43' N.$; Longitude, $79^{\circ} 50' E.$

Horsburgh, Edition 1846.

88. This flagstaff is situated on the western bank of the river or backwater, on which the old town of Cuddalore is built. It was formerly under the charge of a master-attendant, but since that office was abolished in 1837, it has been under the care of the superintendent of sea customs, who employs men of that department to attend to it and the signals, of which two sets of Marryatt's are furnished for the use of the port.

89. Some sand-hills intervening between the beach and the flagstaff, of such elevation as in some directions to exclude its view from the sea, it is probable the Board will be under the necessity of advising its removal to a more convenient situation.

Porto Novo Flagstaff.

Horsburgh, Edition 1846.

Latitude, $11^{\circ} 31' N.$; Longitude, $77^{\circ} 48' E.$

90. This flagstaff is erected near the beach to point out the port, which like the others was at one time under the charge of a master-attendant, whose office being abolished, it is entrusted to the care of the superintendent of sea customs. National flags and Marryatt's book of signals are supplied for use.

Tranquebar Flagstaff.

Horsburgh, Edition 1846.

Latitude, $11^{\circ} 1' N.$; Longitude, $79^{\circ} 66' E.$

91. This flagstaff is placed on the sea-face of the old Danish fort, which is built close to the sea. It is under the sea customs' manager, and is supplied with the national flag, but not with signals.

Negapatam Flagstaff.

Horsburgh, Edition 1846.

Latitude, $10^{\circ} 45' 30'' N.$; Longitude, $79^{\circ} 55' E.$

92. The flagstaff at Negapatam is placed on a bastion of the old fort near the beach, about ($\frac{1}{4}$) quarter of a mile south of the custom-house, and about ($\frac{1}{2}$) half way between the two bars of the river, which here falls into the sea. These bars are seldom both open at the same time, and have only sufficient depth to admit of the passage of boats, except at high-water springs, when vessels of from (50) fifty to (100) one hundred tons, drawing about five feet, are taken across.

93. The office of master-attendant being abolished in 1837, the staff has since been under the charge of the Sea Custom department. National flags and Marryatt's book of signals are supplied for use.

*Point Calimere Beacon.*Powell's Survey, Madras Observatory being in $80^{\circ} 70' 21'' E.$ Latitude, $10^{\circ} 17' N.$; Longitude, $79^{\circ} 54' E.$

94. Between Point Calimere and the northern coast of the Peninsular of Jaffna, in Ceylon, exists an extensive range of banks, which have been appropriately termed the Middle Banks, composed of sand, in some places so firm as to resemble rock when sounded on. The depth over these varies from nine feet to (4) four fathoms, and there are several channels between them, with three to six fathoms, mud and sand, but from their being situated at too great a distance from the shore for any marks to be discerned whereby to indicate their exact positions, there are only two that can be of any practical use to vessels drawing ten or twelve feet water; one with a breadth of six miles, between the south end of the banks and Ceylon, the other about three miles off Point Calimere; and it is to render Palk's Bay more accessible by this last-mentioned passage, that Captain Biden proposed, after visiting the locality in August 1846, that a beacon should be erected on the low sandy point of Calimere. The water in the channel varies from three to four fathoms, with two on either side, but a small patch exists nearly in the centre, with only fifteen feet over it; nevertheless, were the point to remain distinguishable while passing it, the directions given in the published sailing instructions for the bay would enable a vessel to clear the danger, but this is not the case. Point Calimere, jutting out clear and well defined when viewed from the northward or westward, becomes merged in the surrounding low land when abreast of it, so as to render its determination for a compass bearing almost impossible. It is for this reason that a beacon was recommended to be placed there, on the erection of which the Calimere passage will become as easy of navigation as that on the opposite side of the strait; and the larger vessels to and from Paumbem will be able to shorten the voyage, by selecting the direct course through this channel, instead of as now going round the south end of the Middle Banks. A building consisting of a hollow column of masonry, which if required can hereafter be converted into a lighthouse, has been sanctioned, at a cost of rupees (1,960. 12. 1.) one thousand nine hundred and sixty, annas twelve, and pice one, and the civil engineer of the division is now engaged on its construction.

*Paumbem Flagstaff and Buoys.*Latitude, of Flagstaff $9^{\circ} 17' N.$; Longitude, $79^{\circ} 50' 20'' E.$ Powell's survey,
Madras Observa-
tory being $80^{\circ} 17'$
 $21'' E.$

95. The flagstaff at Paumbem is situated on the beach, due east of the rocky dam through which the northern channel leads, and stands immediately before the bungalow of the officer superintending the engineering operations, under whose charge it is placed. It is used as a mark for anchoring in the roads, and for signalizing the rise and fall of the tide to the working parties in the channels. It is not supplied with a set of Marryatt's signals, as the chief portion of the craft using the channel belong to and are manned and commanded by natives.

96. There are also three buoys placed in the Paumbem channels to facilitate the passage through; one as a fairway buoy at the north end of the northern channel; one at the south end of the southern channel; and the third on a sandy knoll, awkwardly situated in the fairway, a little to the westward of it.

97. Two wooden beacons are also erected in the southern approaches to Paumbem, one on the northern extremity of a reef stretching out from some rocky islets, between which and the Island of Ramisseram the eastern channel leads; the other on a rocky patch nearly awash, four miles W. S. W. of the sand bank, lying directly in the fairway.

98. An inland navigation, fit for the passage of vessels drawing ten to twelve feet, and consequently of such as can make use of the pass, extends from Paumbem to Valonookum Point, a distance of about (34) thirty-four miles, formed by a rocky ledge, from two and a half to five miles off shore, having on it several low sandy islands, which afford complete shelter during the S. W. monsoon, which blows here with great violence nearly dead on the shore. Although the navigation is intricate, it is freely used by the coasting craft; but there are two places in which the passage becomes very confined; the first at Ramasawmy's Choultry, nine miles west of Paumbem, where a large black buoy is moored on each side of the channel, which is about a quarter of a mile wide; the other at Naajimundel, thirteen miles further west, at which one buoy is placed to indicate the passage, which is to the north of it.

99. Having connexion with this subject, it may be here noticed, that an establishment of native pilots is kept up for the purpose of taking vessels through the Paumbem passes. They are plentifully supplied with warps and grapnels, for the use of such vessels as may require them; and being under the superintendence of an active East Indian, their duties are performed satisfactorily. At present they are in the pay of Government, but consequent on instructions lately received from the Honourable Court of Directors, a system of licensing will shortly be introduced, when their remuneration will be regulated by their actual amount of work.

*Tuticorin Flagstaff.*Latitude, $8^{\circ} 48' 5'' N.$; Longitude, $78^{\circ} 11' 53'' E.$ Franklin's Survey,
Madras Observa-
tory being in
 $80^{\circ} 17' 21'' E.$

100. The Honourable Court having directed the abolition of the office of master-attendant at Tuticorin on the death of the incumbent, Mr. Baggott, the flagstaff was allowed to fall to decay. Subsequently, however, in consequence of the trade of the port rallying, a successor was appointed, and a new flagstaff has just been raised, occupying nearly the same position as the former one.

101. The port being frequented by English vessels, a set of Marryatt's signals are supplied, and a port boat, with a crew of one tindal and six lascars, placed at the disposal of the master-attendant, who is also furnished with the means of raising heavy anchors.

102. Ships anchor about a mile and a half outside the island on which is exhibited the light; a little to the north of which, and directly in the fairway of boats passing to and from the town, is a rocky patch with two and three feet over it, rendered dangerous during a moderate sea-breeze by its only occasionally breaking. On this a wooden beacon is now placed.

Cochin Flagstaff.

Indian Atlas.

Latitude, $9^{\circ} 58' 5''$ N.; Longitude, $76^{\circ} 18' 10''$ E.

103. The flagstaff at Cochin is situated on the south side of the Backwater, about a quarter mile from the entrance, and is placed under the care of the master-attendant at the port, who also has charge of the light which is exhibited from its topmast head; it is the principal mark for vessels anchoring in the roads, and is furnished with a set of Marryatt's signals.

104. A port boat, manned by a tindal and four lascars, is kept up for the use of the master-attendant.

105. It has been observed in the notice of the Cochin light, that the buoys which were once placed at the entrance to the Backwater were removed in the latter part of 1837, and that in lieu the light was substituted. A beacon was thus established, which served to point out the port during the night, but it could be of no practical utility to vessels crossing the bar, which could only be done during daylight. Some excellent marks for the fairway existed in three Roman-catholic churches on an island inside; but as these were occasionally obscured, inconvenience was frequently experienced from the absence of some objects visible at all times. With the view therefore of remedying this deficiency, the Marine Board, on the suggestion of the collector of Malabar, recommended in June 1846, that the channel over the bar should again be buoyed off, and the Government having acceded to the proposition, three buoys were constructed, one being a spare one, and moored on either side of the outer entrance on the 21st of September 1847. They are taken on shore, and the anchors weighed during the S. W. monsoon, when that coast is generally closed to the navigator.

Calicut Flagstaff.

Indian Atlas.

Latitude, $11^{\circ} 15' 15''$ N.; Longitude, $75^{\circ} 49' 50''$ E.

106. There is no regular flagstaff here now, a column having been erected in lieu for the exhibition of the light. A small mast is, however, rigged out, from the summit of which the national colours and signals are displayed, of which one set of Marryatt's is supplied, and the whole is placed under the charge of the sea-customs' manager.

Tellicherry Flagstaff.

Indian Atlas.

Latitude, $11^{\circ} 44' 50''$ N.; Longitude, $75^{\circ} 32' 50''$ E.

107. This flagstaff is on one of the bastions of the fort, and is placed under the charge of the master-attendant at the port. It is one of the principal marks for anchoring in the roads, and is supplied with a copy of Marryatt's book and a set of signals.

Cannanore Flagstaff.

Indian Atlas.

Latitude, $11^{\circ} 51' 20''$ N.; Longitude, $75^{\circ} 26'$ E.

108. This staff, like the others, is a leading mark for the anchorage. It is situated near the sea, on the south side of the fort, and is under the charge of the deputy commissary of Ordnance at the station.

Mount Delli proposed Harbour of Refuge.

109. In September 1840 Major (now Lieutenant-Colonel) Lawe, the civil engineer, of the 7th division, submitted a proposal to Government for the construction of a harbour at Mount Delli, which he observed might be effected by rolling

rolling down masses of the granite of which the Mount, which projects boldly into the sea, is composed, and gradually pushing out a breakwater in a southerly direction, whereby, he stated, might be formed a harbour capable of affording shelter to any number of ships at all seasons of the year, but more especially in the S.W. monsoon. At a rough calculation he named (18) eighteen lacs as the probable expense of carrying into effect this proposal, which sum, however, he thought might be reduced to one lac by employing a company of sappers and miners and a party of (500) five hundred convicts.

110. The Government, fully appreciating the importance of a work of this nature on a coast so deficient in shelter during the prevalence of the S.W. winds, issued instructions for a more detailed examination and report being made in communication with the Military and Marine Boards. Subsequently Captain Biden offered his services to survey the locality, and in November following, the Government having associated with him Lieutenant Fast, of the corps of engineers, he proceeded to the spot. His report was in substance, that a breakwater could be constructed and harbour formed as proposed, although its cost, he thought, would not fall short of fifty lacs of rupees; but it would be attended with certain objections, one of the gravest being that there would not be more than ($5\frac{1}{2}$) five-and-a-half fathoms of water at the entrance, on which a large ship might strike in a heavy sea such as is experienced on that coast in the S.W. monsoon. Another objection was, that although ships might get in, they could not by any possibility get out again without a shift of wind. These were nautical points on which the master-attendant's opinion was of the utmost weight; and although he stated that the last objection might be overcome by making a northern as well as southern outlet, the cost would be so great that he was not disposed to recommend the measure in its original shape, namely, the formation of a harbour of refuge for large ships. The Government decided accordingly that the undertaking involved a contemplated expenditure too vast to admit of its adoption being favourably submitted to the Honourable Court; but they were willing to entertain an amended proposition made by the master-attendant for constructing a pier with the view of forming an inner harbour on a small scale for coasting craft and steamers, which that officer considered might be effected at a very moderate outlay. The civil engineer of the division was consequently requested to report upon the undertaking, but some obstacle probably presented itself, and the matter here dropped.

Mangalore Flagstaff.

Latitude, $12^{\circ} 51' N.$; Longitude, $74^{\circ} 53' E.$

Horsburgh, 1846.

111. The flagstaff at Mangalore is situated on a hill about a mile from the landing-place, and is a very conspicuous object to vessels making the anchorage. There being no master-attendant at the port, its care is entrusted to the sea customs' manager, who is furnished with a copy of Marryatt's code of signals, but not with the flags.

By order,

Madras, Marine Board Office, }
3 October 1848.

(signed)

John J. Franklin,
Secretary.

LIST of LIGHTS, Exhibited or Proposed, in the *Madras* Presidency.

N A M E.	Number of Reflectors.	Latitude.	Longitude.	Height of Light.	Distance at which Visible.	Cost of Maintenance.	R E M A R K S.
Santopillay (proposed)	2	° ' " 18 1 00 N.	° ' " 83 39 00 E.	<i>Ft.</i> 150	<i>Miles.</i> 15	<i>Rs. as. p.</i> 127 10 -	This light is to be placed on a platform on the northern of two remarkable hills, abreast of the Santopillay Rocks, called the Conara Hills.
Coringa - - -	9	16 49 5	82 22 40	66	15	127 12 7	On a tower on Hope Island, off Coringa.
Masulipatam - - -	2	{ 16 9 30 15 57 30	{ 81 12 45 81 14 5	{ 95 - - -	{ 13 - - -	{ 52 7 2	On the port flagstaff, about a mile from the beach.
Armegan (proposed) - - -	- -	13 53 00 N.	80 16 00 E.	- -	15	93 - -	At Point Divi, to which its removal has been sanctioned.
Madras (flashing) -	15	13 5 10	80 20 44	130	20	227 3 -	A column to be erected at the village of Moonapollium, which is due west of the shoalest part of the Armegan shoal.
Negapatam - - -	2	10 45 30	(H) 79 55 00	100	12	30 - -	On a granite column erected on the esplanade north of the fort. Seen 30 miles from the masthead of a ship.
Paumben - - -	4	9 17 30	(P) 79 15 40	84	11	82 - -	On the flagstaff close to the sea. In the N.E. monsoon the lantern is lowered to 88 feet.
Tuticorin - - -	3	8 47 17 N.	(F) 78 14 1 E.	50	10	52 8 -	On a column built on a sand-hill about a mile east of the passage. The reflectors being placed at right angles to each other, the light can be seen from all points of the horizon.
Cochin - - -	1	9 58 5	76 18 10	114	11	15 8 -	On a platform fitted on the summit of an old obelisk on Hare Island, about two miles and a half east of the town.
Calicut - - -	1	11 15 15	75 49 50	105	11	16 6 -	On the flagstaff, about a quarter of a mile from the entrance to the Backwater. In the S.W. monsoon the lantern is lowered to 62 feet.
Tellicherry { Up. Light Low. do. }	{ 2 1 }	11 44 50	75 32 50	{ 140 104 }	11	20 - -	On a column erected near the beach. In the S.W. monsoon, from 20th May to 10th August, it is extinguished.
Cannanore - - -	1	11 51 20	75 26 00	110	11	20 13 2	A double light on the flagstaff burning throughout the year.
Mangalore - - -	3	12 51 00	(H) 74 53 00	250	16	15 - -	On the flagstaff, close to the beach. In the S.W. monsoon the lantern is lowered to 85 feet.

Note.—(H) denotes that the position is taken from Horsburgh's edition of 1846.

(P) denotes that the position is taken from Lieutenant Powell's Survey, allowing Madras Observatory to be in 80° 17' 21" E.

(F) denotes that the position is taken from Mr. Franklin's Survey, allowing Madras Observatory to be in 80° 17' 21" E.

Those not marked are from the Indian Atlas, allowing Madras Observatory to be in 80° 18' 30". The true longitude of the Observatory has, however, now been determined by the late Mr. Taylor to be 80° 14' 15", leaving a correction of 4' 15" applied to the latter, and one of 3' 6" to the survey of Lieutenant Powell and Mr. Franklin.

All these lights are fixed ones, with the exception of that at Madras, which is of the flashing description.

(signed) J. J. Franklin,
Secretary Marine Board.

LIST of BEACONS, BUOYS, &c. established under the *Madras* Presidency.

WHERE.	Nature.	Latitude.	Longitude.	Signals.	REMARKS.
		° ' " (H)	° ' "		
Monsoorcotta (proposed) -	Flagstaff -	19 14 00 N.	85 3 00 E.	none -	To be erected abreast of the anchorage near the beach.
Vizagapatam - - -	ditto -	17 42 00 N.	83 21 15 E.	yes -	On the Dolphin's Nose, under the charge of the military authorities.
Coringa - - - -	ditto -	16 56 25	82 17 40	yes -	At Juggernaikpoorum, about 6 miles north of the town of Coringa.
Masulipatam - - -	ditto -	16 9 30	81 12 45	none -	On the S.E. corner of the fort, about a mile from the beach.
Point Divi (proposed) -	ditto -	15 57 30	81 14 5	none -	On the beach at Point Divi, for the reception of the Masulipatam light.
Eskapillay - - -	ditto -	14 44 00	80 10 30	none -	Near the beach.
Pulicat - - - -	ditto -	13 25 15	80 23 40	yes -	On an island in the Backwater, near the beach.
Madras, Master-attendant's	ditto -	13 6 00	80 21 55	yes -	On the south end of the sea custom and master-attendant's office.
Ditto, Fort - - -	ditto -	13 5 00	80 21 45	yes -	On the sea-face of the fort, under the military authorities.
Ditto, Fort - - -	Buoy -	- - -	- - -	- -	Bears S.E. by E. $\frac{3}{4}$ E. from master-attendant's flagstaff, 300 yards from the shore, on the south end of the granite heaps.
Pondicherry - - -	Flagstaff -	11 55 57	79 53 33	- -	On the beach near the lighthouse; position from Mr. Holstein, Capt. de Port.
Cuddalore - - -	ditto -	(H) 11 43 00 N.	79 50 00 E.	yes -	On the western bank of the Backwater.
Porto Novo - - -	ditto -	(H) 11 31 00	79 48 00	none -	Near the beach.
Tranquebar - - -	ditto -	(H) 11 1 00	79 55 00	none -	On the sea-face of the old fort.
Negapatam - - -	ditto -	(H) 10 45 30	79 55 00 E.	none -	On the bastion of the old fort.
Calimere (proposed) - -	Beacon -	(P) 10 17 00 N.	79 54 20 E.	- -	A white column to be constructed on the low sandy point of Calimere, convertible into a lighthouse, if required.
Paumben - - - -	Flagstaff -	(P) 9 17 00	79 15 20	none -	On the beach in front of the bungalow occupied by the superintendent of operations, and due south of the anchorage, north of the channels.
Paumben - - - -	Buoy No. 1	- - -	- - -	- -	In the fairway at the north end of the northern channel.
Paumben - - - -	" No. 2	- - -	- - -	- -	In the fairway at the south end of the southern channel.
Paumben - - - -	" No. 3	- - -	- - -	- -	On the south side of a four-feet bank to the west of the southern channel.
Paumben - - - -	Beacon No. 1	- - -	- - -	- -	On the north edge of the reef, stretching from the rocky islets east of the southern channel.
Paumben - - - -	" No. 2	- - -	- - -	- -	On a rocky patch four miles W.S.W. of the southern channel.
Ramasawmy's Choultry -	Two Buoys	- - -	- - -	- -	One on each side of this channel, which is but a quarter of a mile wide, and nine miles west from Paumbem.

WHERE.	Nature.	Latitude.	Longitude.	Signals.	REMARKS.
		° ' "	° ' "		
Naaie Mundell - - -	Buoy -	- - -	- - -	- -	On an eight-feet bank, 22 miles west of Paumbem. The deep water is to the north of it.
		(F)			
Tuticorin - - -	Flagstaff -	8 48 5	78 11 55	yes -	On the beach, near the town at the bottom of the harbour.
Tuticorin - - -	Beacon -	- - -	- - -	- -	On a rocky patch of two and three feet, situated north of Hare Island, in the fairway of boats passing to and from the shipping.
Cochin - - -	Flagstaff -	9 58 5	76 18 10	yes -	On the south bank of the Backwater.
Cochin - - -	Two Buoys -	- - -	- - -	- -	One on either side of the channel over the bar; taken up during the S.W. monsoon.
Calicut - - -	Flagstaff -	11 15 15 N.	75 49 50 E.	yes -	A small staff on the summit of the light column.
Tellicherry - - -	ditto -	11 44 50	75 32 50	yes -	On one of the bastions of the fort to seaward.
Cannanore - - -	ditto -	11 51 20	75 26 00	no -	At the south end of the fort; under the military authorities.
		(H)			
Mangalore - - -	ditto -	12 51 00	74 53 00	no -	On a hill 200 feet high, about a mile from the beach.

Note.—The explanation of the letters (H), (P) and (F), given at the foot of the List of Lights, applies equally to the above.

(signed) *J. J. Franklin,*
Secretary Marine Board.

LIST and Description of CHARTS executed under the Orders of the Madras Government.

LOCALITY.	Price.	Scale.	By whom executed.	
	<i>Rs. a. p.</i>			
Paumbem Pass - - -	2 8 -	1,000 yds. = 1.9 in.	Lieuts. Powell and Ethersey, in 1837-38	Published by John Walker, Geographer to the H. E. I. Company, 10 July 1839.
Tuticorin Harbour and Roadstead.	2 8 -	$\frac{1}{4}$ mile = 1 inch -	Mr. Franklin, 1842 -	Published by the Madras Government, and printed by W. Winchester, at Madras.
Tuticorin Harbour and Roadstead.	2 8 -	$\frac{1}{4}$ mile = 1 inch -	Ditto - - -	Published by John Walker, Geographer to the H. E. I. Company, 1 July 1846.
West side of Palk's Straits	2 8 -	2 miles = 1 inch -	Lieuts. Powell and Ethersey, 1837-38	Published by John Walker, Geographer to the H. E. I. Company, 30 April 1846.
Coasts from Paumbem to Tuticorin.	2 8 -	2 miles = 1 inch -	Lieuts. Powell and Ethersey, continued by Mr. Franklin.	Published by John Walker, Geographer to the H. E. I. Company, 30 April 1846.
Coasts from Tuticorin to Cape Comorin.	2 8 -	2 miles = 1 inch -	Mr. Franklin - -	Published by John Walker, Geographer to the H. E. I. Company.

Note.—All these are sold by the Master-attendant at Madras and Tuticorin, and the officer in charge of the engineering operations at Paumbem, these being the places where they are most likely to be required. No allowance is made to these officers on account of such sales.

(signed) *J. J. Franklin,*
Secretary Marine Board.

LIST and Description of NOTICES relating to the Navigation of the Coasts, published from time to time by the *Madras* Government.

DATE.	How Published.	ON WHAT SUBJECT.
18 November 1835	Government Gazette	Notice by Commodore Moresby, I. N., respecting Pigeon's Island and Mangalore, on the Malabar coast.
26 November 1835	Ditto - - -	Notice of the exhibition of a light on the flagstaff at Tellicherry, by Mr. Clementson, principal collector of Malabar.
12 April - 1839	Ditto - - -	Notice of the removal of the buoys at Cochin, and the exhibition of a light from the flagstaff, by Mr. Underwood, acting collector of Malabar.
14 April - 1840	Ditto - - -	Notice to caution mariners from approaching the shoals off Point Gordeware and Coringa, by Captain Biden.
12 September 1840	Ditto - - -	Notice of the intention of exhibiting a light on the flagstaff at Masulipatam, by Mr. Grant, collector of Masulipatam.
17 May - 1841	Ditto - - -	Notice of the light at Masulipatam having been exhibited by the Marine Board.
26 November 1841	Ditto, and in a separate sheet for distribution.	Notice for vessels bound to Paumbem, with sailing instructions, by Captain Jenkins, deputy assistant quartermaster-general of the army in charge of operations, Paumbem.
31 December 1841	Government Gazette	Instructions for Tuticorin roadstead, by Mr. Franklin.
14 October - 1842	Ditto - - -	Notice of a danger off Manuckpatam, by the Marine Board, communicated by Mr. H. C. Hamilton, collector of Cuttack.
29 October - 1842	Ditto - - -	Notice of a light being exhibited on the flag-staff at Mangalore, by the Marine Board.
29 October - 1842	Ditto - - -	Instructions for Mangalore roadstead, by the Marine Board, communicated by Captain Biden.
9 October - 1843	Ditto, and in a separate sheet.	Notice of the exhibition of the new light at Madras, by the Marine Board.
5 February 1844	Government Gazette	Notice of the light at Cochin, by the Marine Board.
29 March - 1844	Ditto, and in a separate sheet.	Sailing directions between Tuticorin and Cape Comorin, by the Marine Board, communicated by Mr. Franklin.
29 March - 1844	Ditto, ditto - - -	Sailing directions for Palk's Bay, by Mr. Franklin.
8 January - 1845	Government Gazette	Notice of the exhibition of a light on the flagstaff at Cannanore, by the Marine Board.
1 August - 1845 May - 1846	Separate sheet - - - Government Gazette	Notice of the exhibition of a light on the Dutch obelisk, Hare Island, Tuticorin, by Mr. Franklin.
15 December 1845	Ditto - - -	
29 April - 1846	Government Gazette and separate sheet.	Notice of the exhibition of a light at Paumbem, by Mr. Franklin.
21 May - 1846	Government Gazette and separate sheet.	Instructions for navigating the Gulf of Manaar, by Mr. Franklin.
20 July - 1846	Government Gazette	Notice of the exhibition of a light from the flagstaff at Negapatam, by Sir H. Montgomery, Bart., collector of Tanjore.

DATE.	How Published.	ON WHAT SUBJECT.
21 September 1846	Government Gazette and in separate sheet.	Instructions for the Coromandel coast and Santopile Rocks, by Captain Biden.
1 February 1847	Government Gazette	Notice of the exhibition of a light at Calicut, by the Marine Board, communicated by Mr. Conolly, collector of Malabar.
19 October - 1847	Ditto - - -	Anchoring directions for the roadstead of Cuddalore, by the Marine Board, communicated by Mr. Smith, superintendent of sea customs.
11 February 1848	Ditto - - -	Notice of two buoys being placed at the entrance to the Cochin Backwater, by the Marine Board.
17 March - 1848	Ditto, and on a separate sheet.	Notice furnished by Mr. Bradley, master of H. M.'s Ship "Fox," relative to the erroneous position of several places in Duncan's Passage and the S.E. part of the Southern Andaman, by Captain Biden.

(signed) *J. J. Franklin,*
Secretary Marine Board.

NOTICES RELATING TO THE NAVIGATION OF THE COASTS.

I.—From the "Bombay Government Gazette."

NOTICES TO MARINERS, by Commander *Moresby*, of the Honourable Company's Surveying Ship "Benares."

Pigeon Island, coast of Malabar. Latitude taken from the centre of the island, $14^{\circ} 1' 05''$ N. Longitude $1^{\circ} 28' 54''$ east of the saluting battery at Bombay, or $74^{\circ} 23' 28''$ east of Greenwich. The magnetic variation observed was $21'$ east, and the dip of the needle $7^{\circ} 37'$.

Mangalore.

Mangalore flagstaff about four years back was removed nearly one mile further inland, and it now stands N. 36° E. about one mile and a half distant from the mouth of the river.

The best anchorage for ships in the roads is the flagstaff in one with the south point of the river, bearing N. E. by N., 5 fathoms, muddy bottom, distant about one mile and a half from the shore, at which position a small house with a single tree near it on a round fortified hill bears S. E., distant about three miles.

The latitude of the flagstaff is $12^{\circ} 52'$ north, the longitude of it $1^{\circ} 59' 01''$ east of Bombay, or $74^{\circ} 53' 42''$ east of Greenwich.

This is supposing Bombay saluting battery to be in $72^{\circ} 54' 41''$ E.

The mean variation observed on shore by several theodolites was found to be $23'$ E.

(signed) *Charles Malcolm,*
Superintendent of the Indian Navy.

Bombay, 18 November 1835.

(True copy.)

(signed) *J. J. Franklin,*
Secretary Marine Board.

II.—*Lighthouse at Tellicherry.*

Principal Collector's Office on Circuit,
Manuapooram, 26 November 1835.

THE Right Honourable the Governor in Council having been pleased to authorise a light to be hoisted on the flagstaff at Tellicherry, notice is hereby given that the same will appear on the 1st December 1835, and be continued every night from sunset to sunrise, for the guidance of vessels to their anchorage, as laid down by Horsburgh.

The light will burn at an elevation of 130 feet above the level of the sea.

(signed) *F. Clementson,*
Principal Collector, Malabar.

(True copy.)

(signed) *J. J. Franklin,*
Secretary Marine Board.

III.

Malabar Principal Collector's Office,
Calicut, 12 April 1839.

NOTICE is hereby given that the buoys hitherto laid down at the mouth of the Cochin River were withdrawn on the 1st instant, from which date a light has been shown from the flagstaff at that port, about (111) one hundred and eleven feet above the level of the sea.

The proper place for ships to anchor outside the bar is in $5\frac{1}{2}$ fathoms, muddy bottom, with the flagstaff bearing E. N. E.

The leading marks for ships running into the river is the northernmost of the three churches up the harbour at Anjicaimal, on with the Vypeon Point.

A pilot is employed at Cochin, who will board any ship hoisting the prescribed signal according to Marryatt's code.

A plan of the harbour of Cochin is annexed.

(signed) *W. E. Underwood,*
Acting Principal Collector, Malabar.

(True copy.)

(signed) *J. J. Franklin,*
Secretary Marine Board.

IV.—*Notice to Mariners.*

Caution to Coasting Vessels approaching the Reefs and Shoals off *Point Gordeware* and *Coringa*.

THE commanders of the barque "Charles Dumergue" and the brig "Union" have reported that the shoals off Point Gordeware and Coringa extend to the eastward and N. E. beyond their known limit. Previous to the disastrous hurricane and inundation at Coringa in November last, the brig "Union" on her last voyage to the northern ports ran aground on one of the shoals off Point Gordeware, and Captain Wilkins is confident that he was deceived by the extension of the shoal.

As it is extremely probable that the shoals and banks of soundings are affected by the storms and inundation which have occasionally happened on the coast of Coromandel, and are liable to change, therefore a cautious approach, a strict attention to the lead, and a vigilant look-out are always necessary, but now more especially, in the vicinity of Coringa and Point Gordeware.

Master-Attendant's Office,
Madras, 14 April 1840.

(signed)

Christopher Biden,
Master-Attendant.

(True copy.)

(signed)

J. J. Franklin,
Secretary Marine Board.

V.

Masulipatam Zillah,
Collector's Circuit Cutcherry at Ibrahimpatam,
12 September 1840.

NOTICE is hereby given that a light will be exhibited on the flagstaff at Masulipatam on the 20th proximo, at an elevation of about 95 feet above the level of the sea.

The bearings of the light will be as follows:

Point Devi bearing west in 6 fathoms, the light will bear N. W. by N.

Point Nursipore bearing west in 7 fathoms, the light will bear W. $\frac{1}{2}$ S. Sy.

In standing into the roads from Point Devi, it is advisable to shape a course $\frac{1}{2}$ or 1 point northerly to avoid the flat, which extends some distance off the western shore from Point Devi to the roadstead.

The light will be clearly visible 15 miles from the deck of a 700-ton ship, and 20 or more from the topmast head.

(signed)

P. Grant,
Collector of Sea Customs.

(True copy.)

(signed)

J. J. Franklin,
Secretary Marine Board.

VI.

Marine Board Office, Madras,
17 May 1841.

WITH reference to the advertisement which appeared in the "Fort St. George Gazette" of 20 October 1840, notice is hereby given that since the 1st day of December last a light has been exhibited, and that it will in future be continued, on the flagstaff at Masulipatam, at an elevation of about 95 feet above the level of the sea.

The bearings of the light are as follows :

Point Devi bearing west in 6 fathoms, the light bears N. W. by N.

Point Nursipore bearing west in 7 fathoms, the light bears W. $\frac{1}{2}$ S. Sy.

In standing into the roads from Point Devi, it is advisable to shape a course $\frac{1}{2}$ or 1 point northerly to avoid the flat, which extends some distance off the western shore from Point Devi to the roadstead.

The light is clearly visible 15 miles from the deck of a 700-ton ship, and 20 or more from the topmast head.

By order of the Marine Board.

(signed)

John Robert Boyson,
Acting Secretary.

(True copy.)

(signed)

J. J. Franklin,
Secretary Marine Board.

VII.

Notice to Vessels bound for Paumbem.

Marine Board Office, Madras,
26 November 1841.

NOTICE is hereby given that a buoy has been placed in the Channel through the spit of sand running from Mootoopettah Point to the Island opposite Keelacurray, and is fixed there with 4 fathoms of chain cable.

The bearings taken at the buoy are as follows :

Keelacurray	-	-	N. 82° W.	W. $\frac{3}{4}$ north.
Shera Moodelly two	-	-	S. 18° W.	S. by W. $\frac{1}{4}$ west.
Tiroopany Coil	-	-	N. 6° W.	N. $\frac{1}{2}$ west.
Mootoopettah Point	-	-	N. 64° E.	N. E. by E. $\frac{3}{4}$ east.

Two beacons have been erected, one on each side of the channel on the banks opposite Ramasawmy's Choultry, from which they bear nearly south $\frac{1}{2}$ east; another beacon has been placed on the clump of rocks off Mundapum and a perch on the Coral reef near the Horse-shoe Bank.

Vessels can now sail with safety the inner channel even without the aid of the Keelacurray pilots, by attending strictly to the underwritten instructions.

By Order of the Marine Board.

(signed)

J. R. Boyson,
Acting Secretary.

SAILING INSTRUCTIONS for Vessels bound for *Paumbem* from *Keelacurray*, by the Channel inside the Islands.

FROM *Keelacurray* steer for the Bungalow at *Mootoopettah*, east north east $\frac{1}{4}$ east till you bring the buoy to bear S. E. (when *Tiroopany Coil* will bear north, north north west $\frac{1}{2}$ west) then steer for the buoy, passing it close (on either hand), continue your course till in three fathoms, then steer in the direction of *Ramasawmy's Choultry*, east by north, when off *Mootoopettah*, east for the beacons, on the flats off *Ramasawmy's Choultry*. There are three channels through them; the deepest is that passing north of the northernmost beacon, but not much frequented, it being intricate and winding. When you bring the northernmost beacon to bear, east by north $\frac{1}{2}$ north steer for it passing it to the northward at the distance of 50 fathoms, when you get the two beacons in one steer east $\frac{1}{2}$ south till you sight the perch erected on a clump of rocks off *Mundapum*; sailing again from *Paumbem* for *Mootoopettah* with the wind at south, keep your luff, till you bring the southernmost beacon to bear east; then steer for it passing it to the northward, and continue your course for *Mootoopettah*. From *Keelacurray* with the same wind you can keep your luff till you bring the southernmost beacon to bear east, and *Ramasawmy's Choultry* north by east, then bear away in the direction of *Vādāly*, passing between the beacons, leaving the northernmost one above 50 fathoms to your left; when you have brought that beacon to bear south of west, luff again, and steer as before directed; now it must be explained, that the beacons are erected on banks, and that due west of the northernmost one $\frac{1}{4}$ of a mile distant, is a bank with 9 feet water, the channel north of that beacon is a quarter of a mile wide, and to the eastward of the centre between the beacons, there is another bank; when on it, the beacons bear respectively north-west and south-west (on this bank a beacon will eventually be erected), there are channels on each side, about 300 yards wide, between it and the beacons, when you sight the perch off *Mundapum*, steer for it, passing to the northward, giving it a tolerable wide berth, thence east north east $\frac{1}{4}$ east, for the perch on the coral reef, and anchor for a pilot off the mouth of the channel in the Horse-shoe Bank, *Tonatory Point* bearing north-west $\frac{1}{4}$ north (or should you wish to sail through without waiting for a pilot), when you bring the two perches, on the island opposite *Goovistakal Point*, in one, steer north-west, keeping them in line; on the point near *Tonatory*, is also a perch, which can be kept a little open to the southward, of a beacon on the bank, this will take you through the Sandbank Channel, when you open a sandy hill of the tope near the Backwater, and are near to the beacon, on the bank; bear up, leaving it about 40 fathoms to the westward, and steer for the beacons in the large channel, and pass between them, keeping in the centre of the channel.

(signed) *T. A. Jenkins*, Lieutenant,

Deputy Assistant Quartermaster-general
of the Army, Supporting Operations
at *Paumbem*.

Paumbem, 10 November 1841.

னாகளின்மேலே கோபுரங்கள் கட்டப்பட்டிருக்கிறதுகள். முக்கால்மயில் தூரத்திலே இரு
 க்கிறவடகோடி பீக்கன்கோபுரத் துக்குதேர்மேற்காவது எதுவென்றால், ஒன்பது அடி ஆழ
 முள்ள சலத்தோடே கூட இருக்கிற ஒருமணல்க்கணாநான். அந்தபீக்கன்கோபுரத் துக்கு வ
 டக்கே இருக்கிற ஆற்றுவாயானது, கால்மயில் அகலம் உள்ளது, அந்தபீக்கன்கோபுரங்களு
 க்கு மத்தியஸ்தலத்துக்குக் கிழக்கே மேலே ஒருமணல்க்கணா இருக்கிறது. அந்தபீக்கன்
 கோபுரங்கள் அந்த மணல்க்கணாயின்பேரிலிருக்கும்போது ஒன்று வடமேற்காகவும் ஒன்
 றுதென்மேற்காகவுமிருக்கிறதுகள். (இந்தமணல்க்கணாயின்பேரிலே ஒருபீக்கன்கோபுரம்
 தேர்பாட்டுக்குத்தக்கதாய் கட்டப்படும்.) அதுக்கும் அந்தபீக்கன்கோபுரங்களுக்கும் மத்
 தியிலே ஒவ்வொருபக்கத்திலே ஏறக்குறைய முத்துறுகெஜ் அகலத்திலே ஆற்றுவாய்களிரு
 க்கிறதுகள். அந்தமண்டபத்துக்கு எதிரிலிருக்கிற பெர்ச்சுக்கட்டையை நீகாணுகிறபோது,
 அதற்காக ஒட்டி, வடக்கே போய், அதுக்குத்தகுமான அகலம் விட்டுவிடு. அங்கிருந்துவரி
 சையான பவளப்பாறிலே இருக்கிற பெர்ச்சுக்கட்டைக்காக கீழ்வடகிழக்கின் அனாகிழக்கே
 போய், வடமேற்கின் முக்கால் வடக்கைப்பிடித்துக்கொண்டு, குதினாத்தீவுதேணித்துறை
 முவனியிலே ஆற்றுவாயின் முகத்துவாரத்துக்கு எதிரிலிருக்கிற ஒரு ஆறுகாட்டி நியித்தம் நங்
 கூரம்போய் (இல்லாவிட்டால் ஒரு ஆறுகாட்டிக்காக காத்திராமல் முடியபோய் விட மனசா
 இருக்குமானால்) குவிஸ்தாக்கல் முவணக்கு எதிரான தீவிலே இருக்கிற இரண்டு பெர்ச்சுக்
 டைகளும் உனக்கு ஒன்றாகத்தோற்றும்படியாவரும்போது, அதுகவிர அணியாகவைத்துக்
 கொண்டு, வடமேற்காக ஒட்டு. தோணித்துறைகிட்ட இருக்கிற முவனியின்பேரிலே கூட ஒ
 ரு பெர்ச்சுக்கட்டை இருக்கிறது. அந்தபெர்ச்சுக்கட்டை அந்த மணல்க்கணாயின்பேரிலிருக்கி
 ற ஒருபீக்கன்கோபுரத்துக்குதெற்கே கொஞ்சம் ஒதுங்கிக்காணவேணும். இது அந்தமணல்
 க்கணா ஆற்றுவாய் முடிய உன்வணக் கொண்டுபோகும். பாக்குவாட்டர் என்கிற கழிமுவண
 க்குச்சிட்டே இருக்கிறதோப்புக்கடுத்த மணற்குன்றைகண்டு, மணல்க்கணாயின்பேரிலிருக்கி
 ற பீக்கன்கோபுரத் துக்கு சமீபமாய் நிவந்தபோது அதற்காக ஒத்தி அப்போது நார்பதுபாக
 மட்டும் மேற்கே விட்டுவிடு. பெரிய ஆற்றுவாயிலிருக்கிற பீக்கன் கோபுரங்களுக்காக ஒட்டி,
 அந்த ஆற்றுவாயின் மத்தியைப் பிடித்துக்கொண்டு, அந்தகோபுரங்களுக்கு நடுவேபோ.
 பாம்பன் - சத அளசக (ஸ்) } ட்டி. ஏ. ஜென்கின்ஸ், லெப்ட்டன் தண்டின்குவார்டர்
 நவம்பர் 1870 } மேஜ்டர் ஜெனரலுக்கு டிப்பி அசிஸ்டாண்டு,
 பாம்பன் ஆற்று விசாரணைக்கார்த்தர்.

(A true translation.)

A. ROBERTSON,

Tamil Translator to Government.

VIII.—*Instructions for Tuticoreen Roadstead.*

SHIPS making the land about Tuticoreen must be careful not to get too far to the northward, as some spits, with only (17) seventeen feet on them, lie at a distance of (5) five miles off Vypar, having from (4) four to (6) six fathoms on each side. To avoid these, keep some large conspicuous trees at Putnurmurdoor (seen ten miles off, and when no other object on shore is perceptible) to the northward of west; these are seven miles north of Tuticoreen.

The best anchorage in the roadstead is in from ($5\frac{1}{2}$) five and a half to ($6\frac{1}{2}$) six and a half fathoms, sand, with the obelisk on Hare Island from W. N. W. to W. by S., distant about one mile and three-quarters; during the months of August and September, when strong winds are invariably from the land, vessels may anchor in (5) five fathoms, but should not approach closer, as a ledge extends from north to south, at a distance of one-half to one mile outside the islands, with uneven soundings, from 10 to 20 feet, on it.

The N. E. monsoon sets in about the latter end of October, with heavy rain, but is light and variable till the middle of November; it then blows steadily and strong. The S. W. monsoon commences about the middle of May, blowing with great violence till the end of July. Few vessels anchor on the coast during this time, all communication with the shore being cut off. The currents set with the wind to the S. W. in the N. E. monsoon, and *vice versa*, at an average of about a knot per hour, but an interval of a month or six weeks occurs between the monsoons, when they, as well as the winds, are very uncertain.

Latitude of obelisk on Hare Island - - - - 8° 46' 35" N.

Longitude ditto - ditto - - - - 78° 14' 29" E.

(Allowing Point de Galle in 80° 16'.)

High water at full and change - - - - 1 h. 15 m. P.M.

(signed) *John J. Franklin,*

31 December 1841.

In charge of the Manaar Survey.

The position of the obelisk was afterwards taken from Colonel Lambton's Point.

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

IX.—*Notice—Danger off Manuckpatam.*

Marine Board Office, Madras,

14 October 1842.

NOTICE is hereby given that Mr. H. C. Hamilton, Collector and Magistrate at Cuttack, has brought to the notice of the Marine Board at Fort William, that three vessels have been within a few years wrecked on the sand-bank off Manuckpatam, the last being the "Futty Salam," on the 9th of September last, the vessel having gone to pieces immediately on striking, full one mile from the shore. The attention of parties navigating the coast is therefore hereby drawn to the notice of this bank, as extracted from Horsburgh's Directory, volume 1, page 511. From this place (Manuckpatam) a sand-bank is said to project two miles, on which the water shoals suddenly from 10 to 4 fathoms; a ship ought therefore to avoid it in passing, by not coming under 11 or 12 fathoms.

By order,

(signed)

John Robert Boyson,
Acting Secretary.

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

X.—*Light on the Flagstaff at Mangalore.*

Marine Board Office, Madras,
29 October 1842.

NOTICE is hereby given that a light is now and will in future be exhibited on the flagstaff at Mangalore, at an elevation of about 200 feet above the level of the sea.

The height of the mast to the top is 99 feet, and to the yard-arm $50\frac{1}{2}$ feet.

The attention of mariners is particularly directed to the annexed instructions for anchoring with safety in the Mangalore roadstead, and in which the leading land-marks, with their various bearings, are accurately described and laid down.

By order of the Marine Board.

(signed)

J. R. Boyson,
Acting Secretary.

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

XI.—*Instructions for Mangalore Roadstead.*

29 October 1842.

THE best anchorage in the Mangalore Roads is with the flagstaff bearing from E. by N. N. to E. N. E. in from 5 to 6 fathoms muddy bottom.

In approaching Mangalore from the northward, caution is necessary to avoid the St. Mary Isles and a dangerous ledge of rocks called the Peimeira Rocks, which do not appear to be very accurately laid down; the latter are mostly above water, and extend seven or eight miles from the coast, and to the southward of the St. Mary Isle. Fifteen or sixteen fathoms is a good depth of soundings to keep in the parallel of these dangers; and when certain of having passed them, ships or vessels may haul in for the Mangalore Roadstead to 7, 6, and 5 fathoms; and from the excellent light now exhibited on the flagstaff, a proper position for anchorage can be taken up by night, whilst the conspicuous buildings on Flagstaff Hill render that situation sufficiently discernible by day. A few miles to the northward of Mangalore there is a remarkable hill near the coast having a peak at each extremity; this hill, called the Ass's Ears, is a good landmark. Coming from the southward ships or vessels should haul close round Mount Delhie, which bold headland may be approached within one mile, and is 16 leagues south of Mangalore: they may safely coast along until the flagstaff is seen by night, or the buildings about the flagstaff are visible by day, when they can anchor according to the above directions. Attention to the lead and a good look-out are always requisite. It is necessary to observe that the promontory of Mount Delhie extends to the southward of that point about two miles in a direction S. W. by W. from the coast, but this remarkable headland does not project above 200 yards from the coast on its northern side. It forms a deep bay to the southward, affording shelter from north-westers, and a good anchorage in from 4 to $5\frac{1}{2}$ fathoms mud; but there is no light or bay to the northward of Mount Delhie.

By order of the Marine Board.

(signed)

J. R. Boyson,
Acting Secretary.

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

XII.—Notice.

Marine Board Office, Madras,
9 October 1843.

NOTICE is hereby given, that on and after the 1st day of January 1844 a light will be exhibited on the new lighthouse erected at Madras immediately to the northward of the walls of Fort St. George; and that on and after the said 1st day of January 1844, the light heretofore and now exhibited on the old lighthouse within the walls of Fort St. George will be discontinued. The new light (to be exhibited) will be elevated 128 feet above the mean level of the sea, and may be seen from the deck of a ship at the distance of 20 miles. The light is of the flashing description, and the duration of the flashes to that of the eclipses or dark periods is in the ratio of two to three; but as the nature of the motion is reciprocating instead of rotatory, the above ratio merely expresses the average proportion of the light and dark intervals, which are themselves variable according to the position of the spectator. The rapidity of movement is so adjusted that the duration of the flashes will vary from 0" to 48", and that of the eclipses from 0" to 72", the sums of the duration of light and darkness bearing, however, in every position the constant ratio of two to three. From the south-eastern extremity of the Pulicat Shoal the new lighthouse bears S. 23° W., and is distant 13 miles; but no ship or vessel when hauling in from the northward for the Madras roadstead should bring the light to bear to the southward of S. 28° W., or S. S. W. $\frac{1}{2}$ W., unless her position is well ascertained. Commanders of vessels are hereby warned of the serious risk they incur by incautiously approaching the dangerous vicinity of the Pulicat Shoal, as hazy weather or other causes may obscure the light; true soundings, therefore, and a vigilant look-out are imperatively called for. The limits of the Madras roadstead in (8 or 9 fathoms) are comprised within the following bearings, viz., from the northward the lighthouse will bear S. 56° W., and from the southward N. 81° W., or from S. W. by W., to W. $\frac{3}{4}$ N.

The new lighthouse at Madras is in latitude 13° 5' 10" north, and in longitude 80° 20' east of Greenwich.

Published by order of the Marine Board at Fort St. George.

(signed)

J. R. Boyson,
Acting Secretary.

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

XIII.

Marine Board Office, Madras,
5 February 1844.

NOTICE is hereby given, that a light is exhibited from the flagstaff at Cochin from sunset to sunrise. The height of the light when exhibited from the mast-head is 114 feet above the level of the sea; but when the topmast is struck (during the south-west monsoon), the light is then 62 feet above the level of the sea. Vessels coming to an anchor at night should bring the light to bear E. by N. Good anchorage is found in from 5 to 4 $\frac{1}{2}$ fathoms water; but during the south-west monsoon vessels should not anchor in less than 6 fathoms, as there is then a heavy sea rolling in on the coast.

By order of the Marine Board.

(signed)

J. R. Boyson,
Acting Secretary,

(True copy.)

(signed)

John J. Franklin,
Secretary Marine Board.

XIV.—NOTICE.

Sailing Directions between Tuticoreen and Cape Comorin.

1. DIRECTIONS for anchorage in the roadstead of Tuticoreen were published in the Fort St. George Gazette, under date the 7th January 1842. With reference to those instructions, and assuming that the observatory at Madras is

In longitude - - - - - 80° 17' 21" E.

The obelisk on Hare Island is in latitude - 8 47 17 N.

longitude - 78 14 1 E.

Variation of the compass - - - - - 0 51 1 Easterly,

the following instructions are for the guidance of mariners navigating between Tuticoreen and Cape Comorin.

2. From Devil's Point, at the southern extreme of Tuticoreen Harbour, the coast extends in a southerly direction to Trechendore about 17 miles, and the only prominent land which intervenes is the point at Coilnapatam. About a mile to the southward of the point is situated the town of Coilnapatam, and one mile and a half to the northward of Coilnapatam is the small fishing village of Pinnacoil, which is easily distinguished by the ruin of an old square-built church, with a scanty tope of palmyras on the beach to the southward of that building.

3. Trechendore Point in latitude 8° 29' 55" N. and longitude 78° 9' 51" E. is a low rocky bluff headland covered with sand, and having a remarkable high dark pagoda situated on its extremity, and is seen in ordinary weather at 12 to 15 miles distance, and sometimes even at 18 miles. From this to Manapaud the coast runs about S. S. W. eight miles and a half, and thence to Cape Comorin about W. S. W. 36 miles.

4. There is a rocky ledge connecting several small islands, which either terminates or is covered with sand and mud, about three miles south of the island named Mooraveechelly-tevoo, and from this to abreast of Pinnacoil tope there are occasional patches of rock, but the anchorage is in general good one mile and a half to two miles and a half off shore in $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms mud, and with the tope bearing west and the wind at south to S. W., vessels will be protected by the Coilnapatam reef. Mooraveechelly-tevoo is the southernmost island in the Gulf of Manaar on the coast of India.

5. Due east, and two miles and a half from the Pinnacoil tope, is a natural basin in the rocks, which is four miles and a half in length, east and west, and averages one mile and a quarter in breadth; the bottom is fine sand and mud, in 7 fathoms on the western, and 18 to 20 fathoms on the eastern extreme, from which it suddenly shoals from 9, 8, and $7\frac{1}{2}$ fathoms, on a pearl bank. In standing up the coast during the night with a scant wind this is good ground for ascertaining a vessel's position, as there is no spot like it between Paumben and Cape Comorin, and from the outer part of the bank the anchorage off Tuticoreen bears N. by E. nine miles and a half.

6. Two miles and a half N. E. by N. from Coilnapatam commences a dangerous reef, with 10 feet on its northern extremity, extending, with the exception of a break off the little Parawa village of Allendalle, as far as Manapaud Point. The outer edge lies from one mile and three-quarters to two miles and three-quarters off shore, and has in heavy weather a high surf rolling over it in $2\frac{1}{2}$ to 3 fathoms, but ordinarily the sea only breaks on an inner ledge in from 2 to 12 feet, one-eighth to half a mile inside the former. Many small channels exist between the rocks composing the reef, of which the dhoneyys take advantage, but the anchorage inside is not good. The mark for the largest channel is the Periamalia Hill (the highest of the two most conspicuous, and often the only hills visible inland), anywhere between the two large trees at the town of Coilnapatam. The town of Trechendore is situated at the back of the pagoda, and about one mile and a half to the northward in the bight of the bay is the Parawa town of Viranduapatam, second only to Tuticoreen for size and importance, and is inhabited by fishermen.

7. From

7. From Trechendore the foul ground extends to abreast of Allendalle, where a small patch of good anchorage is met with, the church bearing W. N. W. two miles, in $3\frac{1}{2}$ to 4 fathoms mud, protected during the south and south-westerly winds by the southern part of the reef, which here stretches to more than three miles from the shore. It has, like that portion already described, many small channels used by the native craft, but the anchorage inside is very insecure, and subject to a heavy breaking sea during the prevalence of easterly and north-easterly winds.

8. The principal town in the bight, which this reef partly protects, is Coilsinipatnam, and another town, "Manapaud," may be known by the ruins of a large church half buried in the sand, and the mouth of a small river too shallow for internal navigation. Manapaud Point is a high sandy promontory, based on rock jutting boldly into the sea, and having a small whitewashed church on its summit, visible in clear weather at 12 to 13 miles distance; between it and Cape Comorin the reef continues unbroken, but is seldom more than half a mile distant from the shore.

9. The coast, which has hitherto been low, now rises to the height of 100 or 200 feet in undulating sandy hills, and the tops of tall palmyra trees are apparent as emerging from them; the background is mostly of a reddish soil, covered with palmyra trees and bushes, rising gradually to the foot of the Ghauts, which at the Cape approach to within two miles of the shore. Numerous fishermen's villages and small whitewashed churches line the coast, but there are no prominent points to afford shelter, and landing in ship's boats is at all times a difficult and dangerous operation.

10. Cape Comorin, which rises in a gradual slope, is covered on the eastern ridge with palmyra trees, and may easily be distinguished by the reddish appearance of the soil, and a large white choultry situated near the beach; there are two large rocks, with a small one outside, on which the sea at all times breaks with much violence, stretching to the distance of a quarter of a mile from the shore; they are steep to and may with a fair wind be approached within a quarter of a mile in 8 or $8\frac{1}{2}$ fathoms, but with a scant wind caution is necessary, as the current sets rapidly round the point, and may drift a vessel too near and in danger.

11. There is a dangerous reef off Manapaud having from 4 to 10 fathoms on it; the inner extremity of this shoal bears about S. E. by E. five miles from the point, and it extends E. N. E. and W. S. W. ten miles, having an average breadth of one mile. One extreme of the reef projects in a northerly direction from its centre, the apex of which constitutes the inner danger, and the following are the bearings of the two shoalest parts:—

Inner shoal part	{	Manapaud church, N. 54° W. $5'$ — $4\frac{1}{2}$ fathoms sand.
	{	Trechendore pagoda, N. 1° W. $10\frac{1}{4}$.
Centre shoal part	{	Manapaud church, N. 54° W. 8 miles, 4 fathoms sand.
	{	Trechendore pagoda, N. 12° W. $12\frac{1}{2}$.

There are many other patches with $5\frac{1}{2}$ and 6 fathoms, over which a vessel might pass, yet the safest plan, when sailing between the reef and the point, is not to bring Manapaud church to the westward of north till within two or three miles of the point, and then a course E. N. E. will take a vessel clear.

12. After rounding the Cape in from 12 to 14 fathoms, a vessel proceeding by this passage should keep off shore about three miles in 12, 11 and 10 fathoms, shoaling gradually as she approaches Manapaud; there is excellent holding ground to be found from two miles west of the point to a little below Pareathully, which is west of Manapaud from one to two miles and a half off shore; the soundings are from $6\frac{1}{2}$ to $8\frac{1}{2}$ fathoms, sand and mud; but if the outer channel is preferred, a vessel ought not to come under 14 fathoms (which will be 11 or 12 miles off shore), until she has passed Manapaud, when with that church and the Trechendore pagoda in sight, her position cannot be mistaken. This anchorage is only available during the N. E. monsoon. In June, July and August the heavy sea which rolls in on that part of the coast precludes the possibility of any vessel anchoring there; therefore during those months, when the S. W. monsoon is

strong, vessels should anchor off either Allendallee or Pinnacoil, where the coast trending more to the northward becomes a weather shore.

13. In navigating the Gulf of Manaar care and attention must be paid to the lead and soundings, and unless vessels have a good pilot on board, they should never shoal their water to less than 12 fathoms above, and 18 to 20 fathoms below Manapaud. Currents are so irregular in their direction and velocity, that no reliance can be placed as to their true set.

Published by order of the Marine Board.

J. R. Boyson, Acting Secretary.

Madras, Marine Board Office,
29 March 1844.

XV.—*Sailing Directions for Palk's Bay.*

THERE are two good entrances into Palk's Bay from the eastward; one between Point Calimere and the northern end of the Middle Banks, having 19 to 24 feet, the other between the southern end of the same banks and the north coast of Ceylon, with $5\frac{1}{2}$ to 8 fathoms. Sailing directions were published some years back for the northern passage, but I would strongly recommend all commanders with a vessel drawing 12 feet to make use of that to the southward, except with a leading wind, or with the aid of steam.

Paumben bears from Point Calimere S. 31. W. 73 miles; and after rounding the spit that stretches off to rather more than a mile east of the latter place in about $3\frac{1}{2}$ fathoms, three miles off shore, a vessel may stand S. W. $\frac{1}{2}$ S. keeping in $3\frac{1}{2}$ to 4 fathoms, till two tall detached palmyra trees to the westward bear about north. She is then clear of the banks.

This channel, through the centre of which the above directions lead, is three miles wide, having a small sandy knoll, with only $2\frac{1}{4}$ fathoms on, about a mile inside its southern boundary, and 4 miles S. S. E. of the point. The depths on each side vary from 2 to 3 fathoms, with a bottom of hard sand, while that of the channel itself is mostly mud.

The Middle Banks from this stretch in a southerly direction, to within eight miles of the Ceylon coast, having an average breadth of 3, with uneven soundings from 2 to $3\frac{1}{2}$ fathoms; and in one place only 9 feet. This is situated eight miles and a half S. 20° E. from Point Calimere, and nine miles and a half S. 44° E. from the two remarkable trees already noticed. It is composed of hard fine sand, and should be carefully avoided. There is always what is called a swash over these banks, which renders it hazardous to be on them in an open boat during a breeze.

In beating into the bay against the S. W. monsoon, a vessel should stand over to the north coast of Ceylon, and work down to the island of Delft, or Nedoenteevo; whence a stretch may be made across the bay to its western side, where land and sea breezes will be met with, accompanied by smooth water. In the N. E. monsoon a vessel, bound against it, should also work upon the Ceylon side as far as Kayts; when she may stand over to the coast of India and creep to windward in smooth water. With the strong currents ever attendant on the monsoons in the middle of the bay, it is impossible to contend against them without thus taking advantage of smooth water and weather shores.

A well-known shoal extends from about 17 miles S. S. E. of Point Pedro to about six or seven miles N. W. of it, having a good channel of two and a half to three miles wide, with 7, 8, and 9 fathoms mud between it and the shore. The most dangerous part on its northern end bears from the point due east, four miles and a half off shore, to E. 28° S. four miles off shore. It has in some parts as little as $2\frac{1}{4}$ fathoms, and a vessel in passing it ought not to shoal her water on the bank to less than 6 fathoms, when she will be about three miles off shore with deep water inside.

To clear the north end of this bank, having $3\frac{3}{4}$ fathoms on, the break in the trees at Tondimanoor, which is plainly perceptible some few miles at sea, ought not to bear west of S. S. W. till within four or five miles of the land. Inside this, a vessel working to the westward may approach the shore with safety to within

within half a mile, carrying from 6 to 8 fathoms, sand and mud, till abreast of Kangesenthoray, which may be known from its two bungalows, each built on a rocky platform washed by the sea. To avoid some foul ground which, diverging from the beach at this place, reaches to a distance of two miles from the shore a little farther west, she must now be careful not to shoal her water to less than 6 fathoms on her inshore tack; or to less than 5 on her seaboard; as the southern end of the Middle Banks, with $2\frac{3}{4}$ and 3 fathoms over it, lies to the north. The channel is six miles broad from the foul ground to the end of the banks, with $5\frac{1}{2}$ to 8 fathoms, sand and mud in it. When the opening between Karateevo (Amsterdam Island) and the main leads due south, the foul ground is passed; and when Fort Hommonhiel is well open of the N. W. point of Karateevo, the banks are to the eastward. A vessel can then shape a course to any part of the bay, having good anchorage in 4 to 5 fathoms, half to three-quarters of a mile outside any of the islands. If bound to Jaffna, she should, after passing Kayts, stand southerly, rounding Elewateevo, Anellateevo and Nainateevo, at a distance of one to two miles, till within two or three miles of Nedaanteevo (Delft), which she will make ahead. She may then steer easterly, keeping about a mile off Toongreteevo, and taking care not to haul to the north of east till that island has been left four or five miles behind; and anchor according to the directions about to be given. Following out these instructions, a vessel from Point Pedro ought not to shoal her water to less than $4\frac{1}{4}$ fathoms; but more generally have a depth of 5 to 6 fathoms.

Directions for Kayts.

No vessel drawing more than 8 feet should attempt to enter the harbour of Kayts; for although there are $7\frac{1}{2}$ feet in the channel at low-water springs, the greatest rise is not more than 15 inches. To avoid the foul ground extending one mile and a half to the westward of the N. W. end of Karateevo, a vessel ought to keep in 5 fathoms till Elewateevo bears S. by W. She may then stand for that island, shoaling her water to 3 fathoms, till Fort Hammonhiel, built on a rock at the north side of the entrance, bears S. E. by S., when she can steer for it, keeping the custom-house point, on which is a large clumpy tree, over the low sandy point of Karateevo till within a quarter of a mile. She will now be in 9 feet smooth water, and keeping more to the south, may round the fort at a distance of from 200 to 700 yards according to circumstances; care being taken when inside to borrow over on the north side of the harbour till past an old bungalow on that side. Any anchorage may then be selected, but the best is off the custom-house in 11 or 12 feet mud.

Outside, good anchorage is obtained in either monsoon in 13 or 14 feet smooth water, with the fort bearing S. E. one mile and a half; the north end of Elewateevo S. W. one mile and a quarter; and the N. W. end of Amsterdam Island N. E. In the S. W. monsoon, the bank off Elewateevo may be approached a little closer; and in the N. E., the foul ground off Amsterdam, which will give a vessel a little more room for weighing. Large vessels should, of course, anchor further out.

Directions for Jaffna.

A rock was supposed to exist in the approach to Jaffna from the westward, but after a careful examination, no such danger could be discovered; and, although some pilots declare that it is still there, they are unable to point out the precise spot. This added to the testimony of some divers, who declare that they never met with it, although employed in the neighbourhood from childhood, may lead us safely to infer that the pilots are in error, and that no impediment is offered to the safe navigation of this part of the coast. A small vessel having Calmaene Point E. by N. to N. E. may steer for it till she opens Jaffna Fort Church clear of the island of Mandateevo; when she can stand freely for the opening, carrying from 4 to $2\frac{1}{2}$ fathoms over a rocky ledge to $2\frac{3}{4}$ and 3 fathoms inside on sand; and anchor with the following bearings:

Calmaene Point	-	-	-	East.
Fort Church	-	-	-	N. $\frac{1}{2}$ W. to N. by W. $\frac{1}{2}$ W.

But care must be taken not to approach Calmaene Point within 600 or 700 yards, as there are some rocky heads some distance from it.

The best anchorage for a large vessel is outside the rocky ledge with the Fort Church bearing N. by E., over the centre of a small island called "Small Pox Island," just clear of the small cocoanut tope on Mandeteeveo, and Calmaene Point N. E. by E. She would then be in $4\frac{1}{2}$ fathoms sand, about two miles off the island. It must be borne in mind, however, that this anchorage ought not to be used from the middle of May to the middle of August, when the S. W. monsoon, from which there is no shelter, blows with great violence.

Dangers in Palk's Bay.

1. The Middle Banks, already described.

2. A long sandy spit with from 1 to 2 fathoms over it, stretching E. by S., 13 miles from a low point above Kotipatnam, on the coast of India. It has generally a heavy swash of a sea over it, and should not be approached from the eastward nearer than 6 fathoms. Captain Powell places its eastern extremity in $10^{\circ} 2' 30''$ north latitude; and $79^{\circ} 19' 30''$ east longitude, allowing Galle to be in $80^{\circ} 16'$ east. Its bearing from Paumben is N. 22° E. 45 miles; and from Point Calimere S. 50° W. 29 miles.

3. The foul ground off the N. W. end of Ceylon to the eastward of the opening between that and Karateevo, where the coast ought not to be approached nearer than two miles, for although at present there are 12 to 15 feet over the knolls, the depths may decrease, as they are composed of coral.

4. A detached rock about the size of a ship's boat, with only two feet water over it, between Pooleteevo and the Devil's Point, having the following bearings:

Devil's Point—South, three miles.

South end of Pooleteevo, E. S. E. two miles and a half.

Lastly.—Some rocks awash which lie about one mile and a half off the N. E. end of Ramisseram Island, where the soundings ought not to be shoaled to less than 5 fathoms. Care should be taken in the N. E. monsoon not to get into the bay to the east of this island, as it becomes a difficult matter to work out again.

John J. Franklin,
In charge of the Manaar Survey.

XVI.

Madras, Marine Board Office,
8 January 1845.

NOTICE is hereby given, that a light is exhibited from the flagstaff at Cannanore from sunset till sunrise. The height of the light when exhibited from the masthead is 100 feet above the level of the sea, but when the topmast is struck (during the south-west monsoon) the light is then 85 feet above the level of the sea. When exhibited from the masthead, the light may be seen at a distance of from 12 to 15 miles, but when the topmast is struck, it is only visible at a distance of from 8 to 12 miles. Vessels running for the anchorage at night, between the 15th of May and the end of September, ought not to come under six fathoms, with the light bearing north-east by north to north-east by east; this will place them in a very good berth, about two miles and a half off shore. From the end of September to the 15th of May, vessels may safely anchor in five fathoms water with the above bearing, but it is not advisable for vessels of 600 tons burthen and upwards to come under that depth; care should be taken not to mistake any of the lights in the cantonment of Cannanore for that shown at the flagstaff.

By order of the Marine Board.

(signed) *J. R. Boyson,*
Acting Secretary.

(True copy.)

(signed) *John J. Franklin,*
Secretary Marine Board.

XVII.—*Notice to Mariners.*

A FIXED light has been placed on the Dutch obelisk at Hare Island, off Tuticoreen, having the following bearings: the large Catholic church, W. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles. The small church on Vonteevo (the next island to the north) N. by E. $\frac{1}{4}$ E. $2\frac{3}{4}$ miles. North end of the Coilnapatnam reef S. by W. $10\frac{1}{2}$ miles; Trichendore pagoda S. by W. westerly 18 miles. It may be seen in ordinary weather at the distance of 8 to 10 miles from the deck of a vessel of about 300 tons.

A vessel making the port at night may anchor with it bearing from W. N. W. to W. by S. about one mile and three quarters to two miles off shore, where good holding-ground will be found in 6 to $6\frac{1}{2}$ fathoms. At three and a half miles' distance, with the same bearings, the ground is foul on pearl banks.

In approaching from the south the light may be kept about N. N. W. till within three or four miles, when the above anchorage may be selected; but, should a vessel suddenly deepen her water from 7 or 8 fathoms to 12, 15, or 20, she should immediately steer north till she makes the light, taking care to keep farther to seaward if it bears north of N. N. W. The outer part of this deep water lies a little to the north of the head of the Coilnapatnam Reef, and bears S. by E. 10 miles from the Tuticoreen light.

From the north a vessel may keep the light about S. W. till within three or four miles, when she must steer more out for the anchorage; but in no instance ought the water to be shoaled under $6\frac{1}{2}$ fathoms, excepting with the bearings on for the anchorage, and then not under 6.

In the N. E. monsoon vessels should lie with a good scope of cable out; as, although the seas are not heavy, they are sharp, and occasion a chain to jerk. The sea breeze at this time blows on the reef, and a second anchor with chain ranged ought always to be kept ready for letting go.

In the S. W. monsoon, which usually lasts from the middle of May to the middle of August, the port may be made without fear, for although the winds are very violent, they are invariably off shore from W. to S. W., accompanied by smooth water. At this time vessels may approach the reef to 5 fathoms, but should always have a stream anchor to seaward, as occasionally, during the lulls of the monsoon, a light air comes in from the eastward.

Longitude of the obelisk, assuming

Madras Observatory to be in	$80^{\circ} 17' 20''$ E.	-	$78^{\circ} 14' 1''$ E.
Latitude	-	-	$8^{\circ} 47' 17''$ N.
Variation of the compass, 1842	-	-	$51'$ easterly.

(signed) *John J. Franklin,*

Jaffna, 1 August 1845.

In charge of the Manaar Survey.

XVIII.—*Notice to Mariners.*

Madras, Marine Board Office,
15 December 1845.

NOTICE is hereby given, that in order to distinguish the three lights, viz. the one at Cannanore, at Tellicherry, and at Calicut* from each other, two perpendicular lights will be exhibited from the Tellicherry flagstaff from sunset till sunrise, on and after the 1st of January 1846. The upper one on the topmast-head, at an elevation of 140 feet above the level of the sea, and the other on the lower mast-head at an elevation of 104 feet.

By order of the Marine Board.

(signed) *Cecil P. Wortham,*
Acting Secretary.

(True copy.)

(signed) *John J. Franklin,*
Secretary Marine Board.

* The light at Calicut will be exhibited hereafter.

XIX.

Madras, Marine Board Office,

29 April 1846.

NOTICE is hereby given that a fixed light is now exhibited at Paumben, with the following bearings and distances:—

Paumben flagstaff	- - - - -	S. W. by W. 1,300 yards.
Entrance to north channel	- - - - -	West - - 1,500 „
Tonitory Point	- - - - -	W. by S. $\frac{1}{2}$ S. 3,500 „
North Point of Ramisseram Island	- - - - -	E. 21° N. - 6 miles.
Eastern part of the reef off the Shingle Islets	- - - - -	S. 24° E. - $3\frac{1}{4}$ „
Two fathoms rock	- - - - -	S. 14° E. - 7 „

The light is placed on a column erected on a hill to the eastward of the town of Paumben, is 84 feet above the level of the sea, and in ordinary weather should be seen from the deck of a small craft, such as usually navigate the Gulf of Manaar and Palk's Bay, from 11 to 12 miles off.

In making Paumben from the north during the night, vessels may run for the light, bearing S. W. to E. S. E., keeping rather out in coming from the eastward if under 6 fathoms, as the water shoals suddenly after that depth is obtained off the coast of Ramisseram.

The best anchorage is with the light bearing from S. E. $\frac{1}{2}$ E. to E. S. E. 1,200 to 2,000 yards off, in $3\frac{1}{2}$ to 4 fathoms, sand and mud, good holding-ground. The northern entrance to the channel will then be from 600 to 1,200 yards off.

In approaching during the night from the south, care must be taken to avoid the Two-fathom Rock, which has $3\frac{1}{2}$ to 5 fathoms in its immediate neighbourhood. If from the westward, a vessel ought to bring the light north and run with that bearing till about five miles off, which after taking her over a rocky ledge having $3\frac{1}{2}$ to $5\frac{1}{2}$ fathoms on will place her in $5\frac{1}{2}$ to $6\frac{1}{2}$ fathoms mud and sand, about one mile and a half from the reef extending westward from the Shingle Islets. She may then steer N. E. by E. $\frac{1}{2}$ E. till the light bears N. W. by W., when she can run for it till in smooth water and anchor in 4 to 5 fathoms sand and mud, between the land and Shingle Islets before mentioned.

If the light is made from the eastward, a vessel ought to keep it N. N. W. $\frac{1}{2}$ W., edging out a little as she shoals her water to 4 fathoms to avoid the Shingle Islets, and anchor as before. This course would take her very near a patch of rock with 3 fathoms on, but as the craft using the channel are of light draught, no fear need be entertained of striking on it.

These instructions for the south entrance are intended for the use of vessels nearing the port during the S. W. monsoon. In the N. E. monsoon the Island of Ramisseram, which may be approached on this side to within a cable's length, becoming a weather shore, the water is sufficiently smooth to allow of vessels anchoring anywhere, and the bearings above given clearly show the dangers to be avoided.

The least water in the Paumben Channel at the lowest spring tide is $7\frac{1}{4}$ feet, but as the average rise on this is 26 to 28 inches, and in October, November and December 30 to 36, and at times even 42 inches, vessels drawing 9 feet can safely make use of it. Native pilots are always ready to carry vessels through; and to obviate any inconvenience which might be felt by commanders unable to speak their language, a Hindoo Briton as an assistant to the head pilot has lately been employed, whose services will be always available.

By order of the Marine Board.

(signed) *John J. Franklin*, Secretary.

XX.—*Instructions for Navigating the Gulf of Manaar.*

SOME few years since it was considered a hazardous undertaking for a vessel of any size to proceed far up into the Gulf of Manaar, the more particularly during the S. W. monsoon, when it was supposed to be impossible to beat out again. Later experience, however, has shown that no dangers exist that may not be avoided by ordinary care and attention; and that as regards working to windward against the monsoons no difficulty will be experienced if the following instructions be attended to.

In the N. E. monsoon, that is from November to March inclusive, fine weather with land and sea breezes will be found to prevail on the Ceylon side of the Gulf, where good anchorage may always be selected between Colombo and Chilaw at one and a half to three miles off shore in 6 to 9 fathoms sand. Vessels wishing to beat up during the first three months ought therefore to keep over on that side till they have advanced sufficiently far to make certain of their port if bound to the Indian coast, as the breezes there may be expected to blow steadily and strong from N. N. E. with a strong lee current. In rounding Cape Comorin at this time the Indian shore may be kept on board till abreast of Manapaud Point, a high promontory with a small white church erected on its summit. A vessel may then stretch across with advantage, and probably in the next tack fetch Tuticoreen, the only port on the Indian coast frequented by large vessels.

Small vessels of light draught will also find this the easiest method of working up; and if bound to Paumben had better keep the Ceylon shore till abreast of Calpentyne, which they may know by the three long hills of Kodramallai, the only ones near the coast. They can then stand across and make Paumben either by the Eastern Channel between the island of Ramisseram and the reef and islands south of that port; or by the Western Channel between Fresh-water and Anapaar Islands at Valinookum Point.

In the S. W. monsoon a ship ought to keep over on the Indian side till near Manapaud Point, when she will generally be able to fetch to windward of Colombo and be clear of all dangers. The only safe place for vessels of size to anchor in on the Ceylon coast during this monsoon is at Colombo, where the current from the Kalany Gange or Mutwall River running to windward takes much of the strain off the cables of vessels riding there. Should one nevertheless part or find it necessary to slip, she may seek safety by standing across the gulf to Tuticoreen, which being situated on the weather side affords good shelter and anchorage. A fixed light, seen 8 or 10 miles off, was erected on Hare Island at this port last year with a view to facilitate the approach to the anchorage during the night; and the instructions relative to it are herewith republished.

Small craft working down from Paumben will do well to keep inside the islands till they reach the western entrance of the inland navigation at Valinookum Point. They can now work down near the coast as far as Manapaud Point, when their fetching Colombo on the starboard tack may be considered certain.

Colombo flagstaff, which is close to the lighthouse, is in $6^{\circ} 56' 6''$ north latitude, and $79^{\circ} 53' 42''$ east longitude. The anchorage, as given by Captain Steuart, the master-attendant, is in 7 to $8\frac{1}{2}$ fathoms during the S. W. monsoon, with the lighthouse S. S. E. easterly, and the Dutch church, a large building in the bottom of the bay, the upper part of which having a thatched belfry, may be seen over the houses of the town bearing E. by S. In the N. E. monsoon vessels may anchor farther in with the light S. $\frac{1}{2}$ E., and the same church E. S. E. in $6\frac{1}{2}$ to 7 fathoms sand and mud in each position. The Drunken Sailor, a patch of rocks about 100 yards long and 20 broad, with only six feet over it in some parts, is situated 1,150 yards S. W. by W. $\frac{1}{2}$ W. of the flagstaff, and 1,000 yards off the nearest shore. It has from 6 to 9 fathoms close round it.

The harbour, which is only used by small craft, is well protected during the S. W. monsoon by the Custom-house Point, behind which they anchor in $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms sand, with it bearing from S. W. to W. S. W., and Mutwal Point N. by E. to N. N. E. A sandy spit extends from the first-named point in a northerly direction with $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms over it, and 5 to 6 fathoms close outside. To avoid this the Dutch church ought to be kept E. by S. $\frac{1}{2}$ S. till the Custom-house bears S. by W.

Negombo Fort, off which vessels may shortly have to anchor for the purpose of shipping sugar, the produce of estates lately brought under cultivation in its

vicinity, is in $7^{\circ} 12' 9''$ north latitude, and $79^{\circ} 53'$ east longitude. The best anchorage is a mile off shore with the fort about east northerly, just clear of Negombo rocky Point, in $6\frac{1}{2}$ to 7 fathoms sand; but as this sand is not deep, and the stream of the Negombo lake, which empties itself here, sets to the north, I would decidedly warn vessels from anchoring here during the S. W., monsoon, or from May to August inclusive. Rocks awash extend from the point N. by W. $\frac{1}{2}$ W. for 400 yards, and the ledge may be then traced in the same direction with 3, 4, and 5 fathoms over it for two miles and three-quarters further till it terminates in a coral patch having 9 to 12 feet over it, two miles and a half off shore. Small craft can cross this ledge and anchor in 2 to 3 fathoms with Negombo Point S. W. $\frac{1}{2}$ W. and the fort S. E. by E., from a quarter to half a mile off shore.

Chilaw bungalow, in $7^{\circ} 34'$ north latitude and $79^{\circ} 51' 29''$ east longitude, may be known by its high red-tiled roof, seen eight or nine miles off in clear weather. On the charts now extant some rocks are placed near this at some distance from the shore, but they were found to be not more than three-quarters of a mile off, and consequently cannot be considered as forming any obstacle to general navigation. They are situated five miles due north of the bungalow, and are in a line between it and the next point. Twenty-one miles north of the bungalow uneven soundings on rock to as little as $3\frac{1}{4}$ fathoms are found from three to four miles off shore with 6 and 8 fathoms immediately outside. Vessels of size, therefore, ought to be careful not to come within this distance of the land hereabouts, although small craft can at all times go over the shoal.

Dutch Bay, in $8^{\circ} 19'$ north latitude and $79^{\circ} 50'$ east longitude, is well sheltered from all winds, but more particularly from the S. W., which are the strongest on the coast. Vessels can anchor here in $2\frac{1}{2}$ to 3 fathoms stiff mud, close inside the neck of sand that forms the western side of the bay, with a cocoanut tope and house called Paringethoray bearing S. S. W. The only dangers in the approach to it are a rocky patch with $2\frac{1}{4}$ over it at low water, two miles W. S. W. of the north end of the neck of sand before mentioned; and some shoal water three miles N. N. W. of the same point, and two miles and a half west of some palmyra trees, a few of which are leafless, on the island of Karateevo. This last extends north and south about two miles, with an average breadth of one, having over it from 3 feet to 3 fathoms, with a small patch of sand, generally dry, due west of the above trees. There are 4 to 5 fathoms to the eastward of this reef, but no person without being well acquainted with the coast ought to attempt the passage inside. From seaward the north end of the neck of sand ought to be brought to bear S. E. $\frac{1}{2}$ E., when it can be steered for and passed within 50 yards, carrying 3 to 4 fathoms sand.

Very good anchorage in the S. W. monsoon may also be found under the lee of Kodramallai Point in $8^{\circ} 32'$ north latitude and $79^{\circ} 56'$ east longitude, which may be known by the three long hills seen over the low land of Karateevo. In steering for this anchorage the north end of the hills ought to be kept about E. by S. till well past the island, when the anchor may be let go in $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms sand, with the rocky promontory bearing S. S. W. to S. W. one-half to one mile and a half off.

No vessels ought to proceed on the Ceylon side further towards the head of the gulf than this, as there are many shoal places at some distance from the shore, and no good holding ground. In the S. W. monsoon a strong current is found setting to the northward over Adam's Bridge, which abates as the Indian coast is approached; and a confused sea is generally found to prevail near Manaar.

The eastern entrance to Paumben is in $9^{\circ} 15' 30''$ north latitude and $79^{\circ} 17'$ east longitude. Some small islets are situated at the east end of the reef, between which and the island of Ramisseram the channel leads. A pole has lately been erected on the northern limit of the shoal water inside these islets, between which and Ramisseram deep water is to be found. The south end of the cut through the Horse-shoe Bank, by which vessels have to pass in going through the Paumben channel, bears from this pole E. by N.

A fixed light has lately been exhibited at Paumben, seen 11 to 12 miles off in clear weather, respecting which directions have been separately published, and which are recommended to the notice of mariners frequenting the port.

The western entrance to Paumben is situated in $9^{\circ} 9'$ north latitude and $78^{\circ} 40'$ east longitude, leading between Valinookum Point on the main coast of India and the small island of Anapaar, which last must not be approached nearer than a mile till the south end bears south of east.

The

The passage will then be entered, when a straight course for Keelakarry at N. E. by E. may be kept, care being taken to avoid some reefs nearly awash which lie off Erawaddy Point, the easternmost limit of the deep bay opposite the entrance just described. Five and six fathoms will be found at this entrance shoaling to 3 farther in, with an occasional cast of $2\frac{1}{4}$ sand. The best anchorage at Keelakarry is in $2\frac{1}{2}$ to 3 fathoms stiff mud, with a detached ruin east of the town bearing north, and some large terraced houses N. W. Pilots here come on board to take vessels to Paumben, which lies 26 miles farther to the eastward; but should a vessel proceed without such assistance, the following directions must be followed:

Steer for a little outside the next point (Naagimundel) till a small tope between a hillock at the mouth of a rivulet and an old ruined temple bears north; then stand across about S. E. $\frac{1}{2}$ E. for a little outside the west end of the next island (Talliari.) This leads over the deepest part of a spit in $2\frac{1}{4}$ fathoms, with 7 feet on each side, where a buoy will shortly be moored to indicate the channel. Two bungalows at the next point on the main will now be seen, and when they bear N. E. $\frac{1}{2}$ E., steer E. N. E. till they are passed, when due east will take a vessel to the buoys on each side of the passage at Ramasawmy's Choultry. To avoid a sandy knoll with only 7 feet over it, the southern of these buoys ought to bear E. by N. when about a quarter of a mile off; and after passing between them, steer about east for a high beacon erected on a patch of rocks. Leaving this 50 to 100 yards to the southward, stand on for the north end of the next island, Pulleteevo, and round it at about a quarter of a mile off, keeping E. N. E. till the opening between Pulleteevo and the next island bears south, then steer east and anchor near the Sand-bank Channel, which has a buoy to mark its position. No vessel drawing more than $8\frac{1}{2}$ feet ought to attempt this navigation without a Keelakarry pilot.

Tuticoreen light is in $8^{\circ} 47' 17''$ north latitude, and $78^{\circ} 14' 1''$ east longitude. The following are the directions respecting it before adverted to:

A vessel making the port at night may anchor with it bearing from W. N. W. to W. by S. about one mile and three-quarters to two miles off shore, where good holding-ground will be found in 6 to $6\frac{1}{2}$ fathoms. At three miles and a half distance, with the same bearings, the ground is foul on pearl banks.

In approaching from the south the light may be kept about N. N. W. till within three or four miles, when the above anchorage may be selected; but should a vessel suddenly deepen her water from 7 or 8 fathoms to 12, 15, or 20, she should immediately steer north till she makes the light, taking care to keep farther to seaward if it bears north of N. N. W. The outer part of this deep water lies a little to the north of the head of the Coilnapatnam Reef, and bears S. by E. 10 miles from the Tuticoreen light.

From the north a vessel may keep the light about S. W. till within three or four miles, when she must steer more out for the anchorage; but in no instance ought the water to be shoaled under $6\frac{1}{2}$ fathoms, excepting with the bearings on for the anchorage, and then not under 6.

In the N. E. monsoon vessels should lie with a good scope of cable out; as, although the seas are not heavy, they are sharp, and occasion a chain to jerk. The sea breeze at this time blows on the reef, and a second anchor with chain ranged ought always to be kept ready for letting go.

In the S. W. monsoon, which usually lasts from the middle of May to the middle of August, the port may be made without fear, for although the winds are very violent, they are invariably off shore from W. to S. W., accompanied by smooth water. At this time vessels may approach the reef to 5 fathoms, but should always have a stream anchor to seaward, as occasionally, during the lulls of the monsoon, a light air comes in from the eastward.

As a rule, vessels of size ought not to approach the land above Tuticoreen nearer than six or seven miles, as $2\frac{1}{2}$ or 3 fathoms are found 5 miles off in some places. When some large clumpy trees at Putnurmadoor, seen 10 miles off, and when no other object on shore is visible, bear north of west, the shoal water is to the northward.

There are two channels for small craft into Tuticoreen Harbour, but that to the north is so intricate as to be seldom used. The southern one leads between the southernmost island and the mainland, the reef connecting them being crossed in 12 to 14 feet at a distance of half to one mile and a half of the island. This being passed, a course may be steered for Devil's Point on the main, after

closely rounding which, a small vessel may stand direct for the town of Tuticoreen carrying 11 to 9 feet. Before passing Devil's Point $2\frac{1}{2}$ fathoms are found, sand and mud.

At the distance of two miles and a half due east of the Pennacoil tope, a scanty tope to the south of a large ruined building nine miles from Devil's Point, is situated the inner edge of an extraordinary natural basin in the rocks four miles and a half east and west, and averaging one mile and a quarter in breadth; the outer part being the broadest and deepest. The bottom is composed of fine sand and mud, in 7 fathoms on the western to 18 and 20 fathoms on the eastern extreme, from which it suddenly shoals to 9, 8, and $7\frac{1}{2}$ fathoms on a pearl bank. In standing up the coast during the night with a scant wind, this is good ground for ascertaining a vessel's position, as no similar spot exists from Paumben to Comorin. From the outer part in 15 to 20 fathoms, the anchorage off Tuticoreen bears N. by E. nine miles and a half.

Good anchorage in 3 to 4 fathoms mud, with this tope bearing west one mile to one mile and a half, is to be found here during the southerly winds under the lee of a reef, which commences two miles and a half N. E. by N. of the next point (Coilnapatnam) and continues with little exception to Cape Comorin. As far as Manapaud Point this reef varies in its distance from the land from one mile to two miles and three quarters, but thence to Comorin it seldom exceeds half a mile. The head of this reef lies S. by W. $10\frac{1}{2}$ miles from Tuticoreen light.

Trichendore Point, in $8^{\circ} 29' 55''$ north latitude and $78^{\circ} 9' 51''$ east longitude, is 18 miles S. by W. westerly of Tuticoreen light, and may be known by its having a high dark pagoda on its extremity, seen in ordinary weather 12 to 18 miles off.

Manapaud Point, situated eight miles and a half S. S. W. $\frac{1}{4}$ W. of the Trichendore Pagoda, is a high sandy promontory jutting out boldly into the sea. It has a small whitewashed church on its summit, visible in clear weather 12 to 13 miles off, which appears at first like a ship under sail. Some foul ground in 4 to 10 fathoms is situated off this point, extending E. N. E. and W. S. W. 10 miles, with an average breadth of one mile. The following are the bearings of the two shoalest parts.

Inner shoal part	{	Manapaud Church	N. 54° W.	5 miles	}	$4\frac{1}{2}$ fathoms sand.
		Trichendore Pagoda	N. 1° W.	$10\frac{1}{4}$ „		
Centre shoal part	{	Manapaud Church	N. 54° W.	8 „	}	4 fathoms sand.
		Trichendore Pagoda	N. 12° W.	$12\frac{1}{4}$ „		

There are many other patches with $5\frac{1}{2}$ and 6 fathoms over which a vessel might pass, yet the safest plan when going between the reef and the point, is not to bring the church to the west of north till within two or three miles of it. An E. N. E. course will then take a vessel out clear.

Cape Comorin, which is placed by Colonel Lambton in his trigonometrical survey in $8^{\circ} 4' 35''$ north latitude and $77^{\circ} 34' 46''$ east longitude, rises in a gradual slope, is covered on the east side with palmyra trees, and may be easily distinguished by the reddish appearance of the soil, and a large white choultry situated near the beach. Two large rocks with a small one outside, on which the sea at all times breaks with much violence, stretch to the distance of a quarter of a mile from the shore. They are steep to, and may with a fair wind be approached within a quarter of a mile in 8 or $8\frac{1}{2}$ fathoms, but with a scant wind, caution is necessary, as the current sets rapidly round the point, and may drift a vessel into danger.

The breezes in the Gulf of Manaar are generally stronger than on the adjacent coasts, the only moderate months being April and October; yet if the instructions already given be attended to, no difficulty will be found in working up or down against them. The N. E. monsoon sets in with force about the middle of November, and lasts till the end of January, bringing with it a current of from 20 to 30 miles a day to the S. W. It blows steadily from N. N. E. along the Indian shore, but on the opposite side is modified into land and sea breezes, with very fine weather. In February, land and sea breezes commence on the Indian side; and by April, the general set of the wind in the gulf will be found to have drawn round to the southward, the sea breezes being from S. E. to S. W., according to the coast on which they prevail. These now increase in force till about the middle of May, when the regular S. W. monsoon sets in, blowing

blowing with great violence from W. S. W. on the Indian coast, and S. W. on the Ceylon coast, where it commences rather earlier, and is attended with heavy falls of rain, thunder and lightening. In August the strength of the monsoon abates, but strong southerly winds are still experienced in this and the next month, becoming lighter as the season advances. Variable and gentle breezes with smooth water may usually be expected in October, lasting till the setting in of the N. E. monsoon, which is ushered in on the Indian side by 15 or 20 days of heavy rain.

The current will generally be found to set with the wind in the strength of the monsoons; but this is not invariably the case. Care and attention must therefore be paid to the soundings, and unless a good pilot be on board, a vessel ought not to shoal her water during the night to less than 12 fathoms above, or 18 or 20 fathoms below Manapaud on the Indian coast; or to less than 10 fathoms above and 20 below Colombo, increasing the depth to 40 till abreast of Point de Galle on the Ceylon coast; excepting of course her position be ascertained by the bearing of the light at Tuticoreen or Colombo.

Average high water occurs at 1 P.M. on full and change: ordinary rise and fall 18 to 24 inches—at springs 30 to 36 inches. The flood sets in about E. N. E., and the ebb about S. W., but their direction is greatly influenced by the wind.

The variation of the compass may be stated at about 1° easterly.

All the above longitudes are calculated on the assumption of the Galle flag-staff being in $80^{\circ} 6'$ east.

(signed) *John J. Franklin,*

Late in charge of the Manaar Survey.

Madras, 21 May 1846.

XXI.—*Port of Negapatam.*

Tanjore, Kodikaray, 20 July 1846.

A FIXED light will be exhibited from the flagstaff at Negapatam from the 1st August 1846, at the height of 100 feet above the level of the sea.

The bearings of the flagstaff and other principal objects from the roadstead are as follows:—

Distance from the shore, 3,000 yards.

Soundings, $4\frac{1}{2}$ fathoms, muddy bottom.

Flagstaff bearing W. S. W.

Black Pagoda, W. by N.

Village of Numbiancoopum, N. W. by W.

Five Mosques at Nagore, N. W. by N.

(signed) *H. C. Montgomery,*
Collector.

(True copy.)

(signed) *John J. Franklin,*
Secretary Marine Board.

XXII.—*Notice to Mariners.*

Revised, and amended Instructions, touching the Navigation of the Coast of *Coromandel*; and Sailing Directions for the Guidance of Ships and Vessels when bound to the Port of *Coringa*, in either Monsoon.

1. WHEREAS the bank of soundings which lines the coast of *Coromandel* is steep to, and does not extend beyond 12 or 14 miles, and off some positions where the coast is very low, and void of all distinct land-marks, the outer edge of this bank is not beyond from 8 to 10 miles, it is obvious that the utmost care and vigilance are at all times essentially necessary to ascertain when a ship or vessel is within the limits of the bank; for which purpose the deep-sea lead should be carefully attended to, especially when, with a beating wind, a ship or vessel may be standing in for the land.

2. And as many instances have recently occurred which prove that there is frequently a strong set or indraught towards the north-western limit of the *Pulicat*, and the *Armegon Shoals*, commanders of ships and vessels are warned against an incautious approach towards the coast in the vicinity of those dangers, which are steep to, and soundings of 14 and 12 fathoms are within three miles of those banks, decreasing suddenly to 8 and 7 fathoms, which are close to each of the shoals; and although breakers may be seen or heard occasionally, yet such an indication of approach, either to the *Pulicat* or the *Armegon Shoal*, cannot be relied on.

3. And whereas a recent survey of the *Mootapillay Shoal* by Lieutenant *Fell*, I.N., proves the necessity of approaching the coast in the vicinity of that danger with great caution, the attention of commanders of all ships and vessels is directed to the following instructions: *Mootapillay Shoal* is in lat. $15^{\circ} 23' 15''$ N.; two fathoms and a half hard sand is the shoalest part, and that shoal patch bears E. 2° S. from the two conical hills at *Pellore*, and E. 20° S. from the southern brow of a high mountain, and is distant from the shore ten miles; but as those land-marks may frequently be obscured, and only discernible in clear weather, and as there are soundings of 7 and 8 fathoms close to the shoal, ships and vessels should not approach the coast when off the *Mootapillay Bank*, during the night, in less than 20 or 25 fathoms, nor during the day in less than 12 or 15 fathoms.

4. Ships or vessels getting ahead of their reckoning, and overcasting their lead, are not uncommon occurrences on this coast, and should be most cautiously guarded against. When soundings are gained on the edge of the bank in 45, 40, or 30 fathoms, every preparation should be made to tack or wear, as the distance may not be more than from six to nine miles from dangerous patches and reefs, which are accurately described in *Horsburgh's Sailing Directions*; and to guard on the safe side, every officer and seaman should bear in mind the possibility of those shoals having extended to seaward since those directions were published, also the mutability of currents, and the liability of strong indraughts towards the several bights and bays which indent the *Coromandel* coast; and after a heavy gale, or a severe hurricane, the storm wave and the sudden change of current may set ships and vessels much nearer to the shore than reckoned upon. Under all these circumstances, it is absolutely necessary that unremitting attention should be observed in the navigation of this low and dangerous coast, which is very often partially obscure by thick or hazy weather, and sometimes the land cannot be seen when within a few miles; therefore the responsibility of command, and due consideration, will call into constant requisition those anxious duties which are comprised under the well known maxim of—Latitude, Lead, and Look-out.

5. Ships and vessels when bound to *Coringa* from the northward during the S. W. monsoon, should haul in towards the coast to the southward of the *Dolphin's Nose*, and beat to windward close along shore. From the *Dolphin's Nose* until near the low shore of *Golconda*, the coast is high, bold, and rocky, and free

free from all danger, but should not be approached under 12 or 14 fathoms, as those soundings are not above one mile and a half or two miles off shore; there is a high rock close to the beach, near the village of Poondamacka, situated five or six leagues S. W. of the Dolphin's Nose and Wattara, marked by a bungalow on the summit of a hill, bears about S. W. $\frac{1}{2}$ W. 10 leagues from that promontory. Pentacotta, known by a detached conical or sugar-loaf hill, bears S. W. seven or eight leagues from Wattara, and a few miles to the southward of that position, the bold and rocky coast gradually terminates, and may be approached to within 8 or 9 fathoms, and when off the village of Oopadah, 20 leagues S. W. of the Dolphin's Nose, and four leagues N. E. of Jauggernautpooram, ships and vessels may stand in shore to $4\frac{1}{2}$ and 5 fathoms, where a soft muddy bottom commences; when thus far to windward, care should be taken, by making short tacks, to hug the coast, as the freshes from the several mouths of the Godavery in June, July, and August, set with such rapidity, that ships and vessels may, without precaution, experience much difficulty and delay in beating up to the anchorage. Having sighted the lighthouse by day, or the light by night, it may be brought to bear from S. by E. to S. by E. $\frac{1}{2}$ E., and with the flagstaff (which stands a little to the eastward of the Jauggernautpooram Pagodas) bearing from W. $\frac{1}{2}$ S. to W. by S. $\frac{1}{2}$ S., ships and vessels may anchor off Jauggernautpooram or Coconadah, in 4 or 5 fathoms soft mud, and off shore one mile and a half or two miles. As the lead and light will be the only guide at night, soundings must then be carefully attended to.

6. All ships and vessels from the northward, and bound to Coringa, during the N. E. monsoon, should guard against a southerly current, and make the coast between the Dolphin's Nose and Wattara, when they may direct their course for the bay; but in this monsoon, large ships should anchor in 6 fathoms, with the lighthouse bearing S. by E., and the flagstaff W. S. W., where they will find good holding ground.

7. All ships and vessels from the southward, when bound to Coringa, in the S. W. monsoon, should, in the day time, make the land about Narsipoor Point, and not come under 8 or 9 fathoms. This point is low and woody, and the coast presents the same appearance until past the large fishing village of Bundamalunka, which is seven or eight leagues N. E. $\frac{1}{2}$ E. from the point; thence to the reef, off Point Gordeware, the coast is intersected with low shrubs and sand-hills, except about half way between that village and the reef off Point Gordeware, where there is a remarkable tope of apparently isolated palmyra trees; when this tope bears about S. W., the lighthouse, on one of the Hope Islets, may be seen, if the weather is clear. As several ships have been lost in the vicinity of this part of the coast, and as erroneous impressions prevail respecting the soundings and extent of the bank, the Master-attendant on H. C. steamer "Hugh Lindsay," on the 10th ultimo, hauled within two miles of the coast in 7 fathoms, abreast the site where the ship "Active" was wrecked in July last, and from that position the steamer edged away S. E. four or five miles, and carried regular soundings from 7 to 19 fathoms: the same experiment was made between that position and Narsipoor Point, and with a corresponding result. Having passed the tope and sighted the lighthouse, ships and vessels should keep off in 12 or 14 fathoms, until the lighthouse bears about N. W. by N., when they may edge away or haul up to the northward, and attending well to the lead, bring the light to bear N. W., when they will be abreast the southeastern entrance of the Gordeware Reef, which bounds the Hope Islets, and the southern limits of Coringa Bay; with a working breeze, this reef may be approached to 8 or 9 fathoms; it is steep to, and 6 and 7 fathoms are within a quarter of a mile of the ridge or breakers, which are more or less visible according to the force and direction of the wind. Still holding on a northerly course, and having passed Point Gordeware, a low sandy ridge almost level with the sea, and intersected by several knolls or knobs of hard sand which appear above water, and having brought the lighthouse to bear S. W., or S. W. $\frac{1}{2}$ S., ships or vessels may haul up for the bay to N. N. W., and gradually to W. N. W., and when it bears south, with soundings of 6 or 7 fathoms soft mud, they should prepare to anchor, under bearings as indicated in section 5 of these instructions. These directions apply to both day and night, but during the night, when neither Narsipoor Point nor the shore can be seen, the coast should not be approached under 12 or 14 fathoms, and the greatest caution is at all times

necessary when hauling in to make the Coringa light; true soundings, a good look-out, and full preparation to tack or wear or haul off shore at a moment's warning, must be attended to; thick or hazy weather may obscure the light, and it may be prudent to stand off to the southward, until day light.

8. All ships and vessels from the southward and bound to Coringa Bay, in the N. E. monsoon, must endeavour to work up well to the northward of their port, but if they are driven to leeward, they must avoid the danger of being embayed, and should not bring Narsipoor Point to bear to the eastward of north, but stand out to sea until they have gained sufficiently to windward of Point Gordeware, when they must attend to the sailing directions and anchor in a windward position, as already noticed.

9. Hope Island (so designated) has the appearance of one island, and is covered with jungle or brushwood; but it is intersected by several channels, and is therefore a group of islets, and on the south-west end of one of those islets stands the Coringa lighthouse. It is elevated about 80 feet above the level of the sea, and the light is discernible from a ship's masthead in clear weather 15 or 16 miles. It bears from Point Gordeware about W. S. W. In thick weather this light may not be visible beyond 10 or 12 miles, and as the outer edge of the reef is at least six miles from the lighthouse, a ship or vessel may, during such weather, be within four miles of the reef before the light or the lighthouse has been discovered; therefore soundings always require the most prompt and careful attention, especially as there is a possibility of such accident or negligence befalling a light as may entirely put it out. Point Gordeware has extended to the northward since the first publication of Horsburgh's Directions, and the reef has also extended its limits as therein described, both to the northward and eastward; and these changes are attributed to the awful inundation of the sea during the hurricane of November 16th, 1839, and the reaction consequent on that disastrous event; but this apparent change has merely shifted the anchorage off Cocanadah, or in Coringa Bay, farther to the northward, and is not in any way detrimental to the safety of that anchorage.

10. The Bay of Coringa is well sheltered, and is only open from N. E. by E. to S. E. by E. The anchorage is on good holding-ground, deepening to the N. E., and a ship or vessel driving on the mud-bank would not sustain any material injury. The mouth of Coringa River is about S. W. by S. seven or eight miles from the anchorage, and the bar, on which is a ledge of hard sand, with soft mud on either side of it, is distant from the river's mouth about two or three miles; 9 feet 6 inches is about the average height of water over the bar at the full and change of the moon, when it is high water at 9 o'clock; and the rise and fall of tide over the bar is from 5 to 6 feet during the springs.

11. Commanders of ships or vessels cannot commit any error of consequence if they attend with care and attention to Horsburgh's invaluable Directory, and at the same time exercise their own judgment and discretion when certain changes of wind and weather, which cannot always be foreseen, call into aid that practical skill so essential to the safety of navigation.

(signed) *Chris. Biden,*

Master-Attendant.

Master-Attendant's Office, Madras,
13 October 1846.

Notice to Mariners.

SAILING INSTRUCTIONS, as a Guide when Ships or Vessels are on the Coast of *Orixa*, or off the *Santapillay* Rocks, with Sketches of Remarkable Landmarks denoting the true Position of those Rocks.

1. WHEREAS a recent survey of the Santapillay Rocks under the direction of Lieutenant Fell, I.N., and a further inspection thereof by the Master-attendant, on the 6th instant, clearly prove that those rocks comprise one of the most dangerous shoals in the Indian Seas, and as no well-defined landmark has hitherto been notified for the purpose of indicating their locality, and warning commanders of ships and vessels of their near approach to those rocks, it is therefore expedient to publish the following remarks for the guidance of all mariners who may navigate the coast of Orixa and the Bay of Bengal.

2. The Santapillay Rocks are in

Latitude $17^{\circ} 59' 25''$ N.

Longitude $83^{\circ} 47' 37''$ E.

and are distant from the coast between five and six miles. They are about 10 feet under water, steep to on all sides, and their extent is not beyond 200 yards in length. When there is but little wind and a smooth sea this shoal presents no indication by broken or discoloured water, as Lieutenant Fell, when in search of it during very fine weather, brought the surveying brig "*Kristna*" to anchor within 100 yards of the rocks before he could observe the slightest appearance of a shoal. He then proceeded in one of that vessel's boats over the rocks, and found $10\frac{1}{2}$ feet on the shoalest part; on the eastern side 7 and 10 fathoms, and on the western limit $10\frac{1}{2}$ fathoms, rocky bottom.

3. The Master-attendant surveyed the Santapillay Rocks in the Honourable Company's steam vessel "*Hugh Lindsay*," on the 6th instant, during fine weather; and with a moderate breeze from S. W. and a ground swell, the breakers were clearly discerned from the masthead at the distance of six or seven miles, bearing due south, and Santapillay Peak bearing W. by N. in 7 fathoms, off shore about two miles. The breakers were soon after seen from the deck; and at 11 h. 45 m. A. M., when the reef, which broke with considerable force, bore from S. 56° E. to S. 57° E., and Santapillay Peak was bearing N. 43° W., the "*Hugh Lindsay*" was anchored in $9\frac{1}{2}$ fathoms, coarse sand and shells, distant from the reef two miles, and from the coast three miles and a half; latitude by an indifferent observation $18^{\circ} 1'$ N.

4. Two boats were sent under Captain Crawford to examine the reef, and they carried regular soundings from the steamer of 9, and $9\frac{1}{2}$ fathoms, until within a quarter of a mile, and in less than 100 yards of the breakers, where they found $10\frac{1}{2}$ and $10\frac{1}{2}$ fathoms, rocky bottom. The breakers were too high to admit of the boats crossing over the reef, but Captain Crawford pulled round it, and gave as his opinion that the shoal, which lies N. N. W. and S. S. E. is in circumference about a quarter of a mile, with 10 fathoms all round very close to the rocks. From the "*Hugh Lindsay*" the breakers seemed to extend the length of 200 yards.

5. The inner channel is safe for ships and vessels of every class, as soundings of 5 fathoms within a mile of the coast, and $9\frac{1}{2}$ fathoms within a quarter of a mile of the rocks, afford a clear space of nearly four miles in breadth.

6. In fair weather, and when the Peak of Santapillay is visible, that lofty and remarkable landmark affords an infallible guide to the true position of the Santapillay Rocks. This peak is at least 2,000 feet above the level of the sea, and presents a striking contrast to all the hills in its vicinity; it bears N. 45° W. from the rocks, and the base of the mountain is not more than seven or eight miles from the coast. In the event of cloudy weather, when the peak may be obscured, there are two remarkable hillocks close to the beach, which the Master-attendant has named the Great and Little Conara Hill; and when the "*Hugh Lindsay*" had steamed to the S. W. about three miles beyond the position where she had anchored, those hills presented a remarkable change of form, having the appearance of a saddle hill. The northernmost or Little Conara Hill, marked

L.H. in Sketch No. 2, is well situated for a light or obelisk, being not more than half a mile from the beach, and 150 feet above the level of the sea; it bore N. $\frac{1}{4}$ W., and the Santapillay Reef was then plainly visible from the deck bearing E. $\frac{1}{4}$ N. distant four miles, and at the same time Santapillay Peak bore N. 29° W. in 8 fathoms, and off shore about two miles.

7. But in thick weather when no well-defined landmark is discernible, then it becomes absolutely necessary to approach the coast between Ganjam and Vizagapatam with great care and caution. Change of current, and the absence of all means, by night or day, of obtaining a single observation, may, without strict and unremitting attention to soundings, place a ship or vessel in imminent peril close to, or upon the Santapillay Rocks, which should not be approached from the eastward, by day or night, under 17 fathoms.

8. Horsburgh's description of the rocks and their position is denoted with his usual accuracy, but as his directions afford no information about the leading marks on shore, the subjoined * sketches of Santapillay Peak and the Conara Hills, and the bearings therein specified, cannot fail to be serviceable to commanders of ships and vessels when they make the land in the vicinity of the Santapillay Rocks.

(signed) *Chris. Biden,*

Master-Attendant's Office, }
21 September 1846. }

Master-Attendant.

(True copy.)

(signed)

John J. Franklin,

Secretary Marine Board.

XXIII.

Calicut, 1 February 1847.

NOTICE is hereby given, that a fixed single light will be exhibited at Calicut from the 15th instant, on a column of masonry 105 feet above the level of the sea.

The column, which is white, may be seen from the deck of a ship at a distance of about 14 or 15 miles during the day time, and the light (which is a small one) may be distinguished at a distance of about 9 or 10 miles during the night.

The Calicut Shoal bears from the lighthouse N. N. E., distance about one mile and a quarter.

The best anchorage for shipping is in 5 fathoms, with the lighthouse bearing from E. to E. N. E.

There is 3 $\frac{1}{2}$ fathoms near the western edge of the Calicut Shoal, but vessels passing the port, either by day or by night, should not come under 5 fathoms; this depth will carry them well clear of the shoal.

The light will not be exhibited from the 20th of May to the 10th of August of each year.

(signed) *H. V. Conolly,* Collector.

(True copy.)

(signed)

John J. Franklin,

Secretary Marine Board.

* Vide Sketches issued with Gazette of the 10th November 1846.

XXIV.—*Instructions for Vessels making the Port of Cuddalore.*

Madras, Marine Board Office,
19 October 1847.

A VESSEL should anchor in $5\frac{1}{2}$ or 6 fathoms, mud and sand, with small shell, with the flagstaff bearing N. W. by N. to N. W. $\frac{1}{2}$ N., and the first tuft of trees to the north of the bar N. W. by W., when the Backwater or river will be distinctly seen. The flagstaff will appear between two high sandy hillocks, but rather nearer the southern one, and the white building and church in the centre between the southern sandy hillock and the tuft of trees at the bar.

By order of the Marine Board.

(signed) *John J. Franklin*, Secretary.

(True copy.)

(signed) *John J. Franklin*,
Secretary Marine Board.

XXV.—*Notice.*

Madras, Marine Board Office,
11 February 1848.

NOTICE is hereby given, that two buoys have been placed to mark the entrance into the Backwater at Cochin, the northern one about one mile and a half from the northern or Vypeen shore; the southern one about a mile and a quarter from the south or Cochin shore. They are in 3 fathoms at low water, and indicate the width of the channel at its entrance, the least water between them in November last being 15 feet at low water on a patch.

High water, full and change, one hour; rise and fall 3 feet 6 inches.

In standing in, keep the middle of the three churches on Arnaculum Island in one with, or a little open of Vypeen inner point; a vessel will then be in the centre of the channel, and midway between the buoys, one or other of which, as may be most convenient, should be approached in order to avoid the patch of 15 feet, on either side of which 3 fathoms will be found; with the above marks on, the water will deepen to 5 and 6 fathoms till abreast the outer Vypeen point, when the shoals will have been passed, and the shores be found bold to approach.

In thick or foggy weather, when the churches cannot be discerned, the buoys will sufficiently point out the channel to enable ships to enter it without danger. After passing between them, they should be steered for a little to the right of Vypeen inner point, care being taken that the current does not set them over to the banks on either side.

These buoys will be removed at the commencement of the S. W. monsoon in May, and replaced on the return of fine weather about September.

By order of the Marine Board.

(signed) *John J. Franklin*, Secretary.

(True copy.)

(signed) *John J. Franklin*,
Secretary Marine Board.

XXVI.—*Important Notice to Mariners.*

EXTRACT from a Letter from *G. L. Bradley*, Esq., Master of Her Majesty's Ship "Fox," to Captain *C. Biden*, dated Trincomalee, 20 March 1848.

"Well knowing the great interest you take in nautical affairs, I have great pleasure in forwarding an account of several important errors in the Admiralty Sheet Chart, No. 12 (by Lieutenant Blair and Captain Moorsom), 1789-1790."

Erroneous Position of several Places in *Duncan's Passage* and South-Eastern Part of the *Southern Andaman*, as determined by the Chronometers on board Her Majesty's Ship "Fox," Commodore Sir *Henry M. Blackwood*, Bart., on her Passage from *Maulmein* to *Trincomalee*, during the Month of March, 1848.

HER Majesty's ship "Fox" sailed from Amherst on the morning of the 22d February 1848, bound to Trincomalee.

It was the intention at first to have passed through the *Preparis South Channel*, but owing to the very light winds and southerly set, this object was relinquished, and a course shaped for *Barren Island*; *Duncan's Passage*, under these circumstances, being considered preferable.

At noon, 29th February, *Barren Island* in sight, bearing S. $\frac{1}{2}$ E. 15 miles (being the difference of latitude by meridian altitude). Our chronometers gave the longitude $93^{\circ} 52' 15''$ E., which places this island in longitude $93^{\circ} 53' 45''$ E., agreeing with Captain Hall's account as given in *Horsburgh's Directory*, and also with the Sheet Chart, No. 12, of the Gulf of Bengal by Lieutenant Blair and Captain Moorsom.

At 3 P.M. 1st March, *Barren Island* N. E. $\frac{1}{2}$ E. 40 miles, and the southern of the *Andaman Archipelago* W. by S. seven miles. Our chronometers gave the longitude $93^{\circ} 16' 15''$ E., which placed the ship by the chart within a mile of the land last named, although to appearance it was at least seven miles, as before stated.

At 9 A.M. 2d of March, our longitude was $92^{\circ} 55' 30''$ E., which again put us within a mile of the land (*Rutland Island*), showing about the same difference as before.

At 9 A.M. 3d of March, when the *Two Sisters* bore west two miles, the chronometers gave the longitude $92^{\circ} 46' 45''$ E., and by another set of sights, when these islands bore north two miles, $92^{\circ} 44' 30''$ E., which may be considered their correct longitude, and places them 12 miles to the westward of the chart, $11^{\circ} 30' 30''$ E. of *Fort Frederick* (*Trincomalee*), and $12^{\circ} 30' 30''$ E. of *Madras Observatory*. Observations were obtained again in the afternoon of this day, when near the *South Centinel*, with similar result to those in the morning.

Immediately on the arrival of the "Fox" at *Trincomalee* (11 days), observations were taken on shore by artificial horizon, the result of which proved the correctness of the chronometers.

The incorrectness of the places mentioned being considered established, renders the approach to this land, from the westward, a matter of great consideration, as by reference to the chart it will be seen the dangers on the western part of this coast are many and of very great importance, particularly in thick weather, which often happens.

It is also reasonable to suppose the invisible bank, and the rock laid down on it on the chart, are incorrectly placed, but considering it (the rock) to be 14 leagues

leagues to the eastward of the Two Sisters, as stated in Horsburgh's Directory, its position by our chronometers will be in longitude $93^{\circ} 26' 30''$ E.; Captain Owen calls it in $93^{\circ} 29'$ E., and the chart places it in $93^{\circ} 40'$ E. There can be little doubt that the position of this very dangerous rock is but imperfectly known, and the fact of Barren Island being correctly laid down, and the Two Sisters 12 miles out, will tend much to bewilder the navigator.

Her Majesty's Ship "Fox," (signed) *G. L. Bradley*, Master.
Trincomalee, 17 March 1848.

(True copies.)

(signed) *Chris. Biden*,
Master-Attendant.

(No. 33.)

From Sir *T. V. Stonhouse*, Bart., Accountant-General, to *J. F. Thomas*, Esq.,
Chief Secretary to Government.

Fort St. George, Accountant-General's Office,
6 February 1849.

Sir,

WITH reference to your letter of yesterday's date, I have the honour to report, for the information of the Right Honourable the Governor in Council, that this office has been engaged, since the receipt of the orders of Government of the 4th May last, No. 183, in collecting the information, therein called for, in regard to the expenditure in the Hydrographic Departments of the East India Company under this Presidency for all the maritime surveys carried on under their authority since the year 1820; a duty which must occupy considerable time and labour, seeing that its performance involves the careful examination of the public accounts of this Presidency, month after month, for a period of 28 years, while in the absence of information of the heads of account under which similar charges were formerly exhibited, it has become necessary to trace these charges through the several heads of account under which they may possibly have been carried; besides which, as part of the information called for is not contained in the accounts furnished to this office, the civil auditor was applied to for a statement containing such information, in detail, as the records of his office furnished in regard to the expenditure, and the other points adverted to in the Honourable Court's despatch, and after communicating with him on the 29th May, 4th September, and 21st December last, a reply has only lately been received, dated the 23d ultimo, stating that considerable difficulty is experienced in obtaining the information required, and that the progress already made in the work is but inconsiderable, and calling upon me to furnish an extract from the ledgers of this office, in which he states the charges will all appear under one head, with the dates and amounts debited, to enable him to furnish the required information. As already remarked, the charges were probably formerly exhibited under more than the one appropriate head of "Marine Charges," but in order to give the civil auditor every assistance in my power in collecting the information in question, I have directed the preparation of extracts from the ledgers of the heads under which these charges may have been possibly carried, and these, which have only just been commenced, will, when completed, be transmitted to the civil auditor. Under this circumstance, I apprehend it will be some time before the statement called for by the order of Government of the 4th May last could be completed and furnished to Government for transmission to the Honourable the Court of Directors, but the Government may rest assured that no unavoidable delay on the part of this office shall take place.

I have, &c.
(signed) *T. V. Stonhouse*,
Accountant-General.

(True copies.)

(signed) *J. F. Thomas*,
Chief Secretary.

No. 1.

Accounts, relative to the EXPENDITURE incurred in the CIVIL DEPARTMENT, on Account of the late Survey of the Western Coasts of the Madras Presidency; from the Official Year 1830-31 to the Official Year 1846-47.

1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
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1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
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1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
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1,800 - -	5,400 - -	7,599 15 11	10,358 - 10	10,828 3 6	10,485 - -	9,750 - -	8,000 - -	2,400 - -	66,621 4 3
- - -	- - -	- - -	431 2 1	495 - -	495 - -	450 - -	360 - -	- - -	2,231 2 1
254 3 6	1,700 - -	2,000 - -	3,000 - -	3,000 - -	2,750 - -	2,500 - -	1,985 8 -	- - -	17,189 11 6
- - -	1,020 - -	1,836 - -	2,985 13 11	3,296 - -	3,300 - -	3,000 - -	2,400 - -	- - -	17,837 13 11
- - -	517 14 5	822 1 5	1,754 6 6	2,448 6 4	918 7 4	1,574 - -	2,879 6 8	In arrears. 511 5 8	11,426 - 4
220 3 6	578 8 6	440 - 6	- - -	- - -	- - -	- - -	- - -	- - -	1,553 6 2
12 4 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	164 4 -
- - -	- - -	- - -	2,528 2 8	- - -	- - -	- - -	- - -	- - -	2,528 2 8
- - -	300 - -	- - -	500 - -	80 12 -	- - -	- - -	- - -	- - -	80 12 -
- - -	- - -	- - -	150 - -	- - -	- - -	- - -	- - -	- - -	800 - -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	150 - -
- - -	- - -	- - -	- - -	1,000 - -	- - -	- - -	- - -	- - -	1,000 - -
- - -	- - -	- - -	- - -	- - -	139 7 10	- - -	- - -	- - -	139 7 10
- - -	- - -	- - -	- - -	- - -	157 12 -	- - -	- - -	- - -	157 12 -
- - -	- - -	- - -	- - -	- - -	636 - -	1,452 - -	1,308 8 -	In arrears. 1,086 - -	4,482 8 -

Nature of the Charges, with the Names of the Districts in which they were incurred.	From May to April 1830-31.	1831-32.	1832-33.	1833-34.	1834-35.	1835-36.	1836-37.	1837-38.
	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.
EXPENSES INCURRED IN MADURA AND TINNEVELLY, IN CONNEXION WITH THE SURVEY OF THE GULF OF MANAAR*—continued.								
Paid for two boat compasses, &c., for the Manaar survey - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For erecting four beacons to point out the course of the channel at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of a barge of 20 tons burthen, constructed for the operations at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For the construction of a lighthouse at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For repairing the convicts' gaol at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of a pilot boat and canoes for the establishment at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Expenses incurred by the government agent at Ceylon on account of the operations at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	1,035 9 2½
Amount of freight paid at different times, for stores, &c., conveyed to and from Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of buoys for the Paumbem Channel - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For erecting a shed for the accommodation of the convicts at work at the Paumbem Pass - - -	- - -	- - -	- - -	- - -	- - -	- - -	137 - -	- - -
Cost of articles furnished on account of the operations at Paumbem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	916 6 1½
Wages, &c., paid a European mariner connected with the Paumbem operations - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
CANARA:								
For erecting a new flagstaff at Mangalore - - -	758 11 10	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Value of a spy-glass for ditto - - -	30 - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For striking the topmast of ditto - - -	3 - -	6 2 -	5 11 9	7 14 -	6 8 -	6 - -	3 8 -	- - -
For rehoisting the flagstaff - - -	6 - -	3 8 -	3 8 -	3 8 -	7 4 -	4 14 -	5 8 -	- - -
Cost of articles furnished for the flagstaff at Mangalore - - -	76 10 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For repairing, retarring, refitting, supplying new ropes, repairing the flags, &c. of the flagstaff at Mangalore - - -	17 3 1	96 12 8	48 11 10	60 - -	42 - -	160 12 1	- - -	1 - -
Cost of a chest for securing the flags - - -	- - -	- - -	- - -	- - -	7 8 -	- - -	- - -	- - -
For erecting a thatched roof to protect the steps of the flagstaff during the monsoons, and for repairs subsequently made - - -	- - -	- - -	- - -	- - -	- - -	- - -	18 8 8	5 8 -
For purchasing and fitting up a new topmast with rigging for the flagstaff at Mangalore - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of a lantern for the flagstaff light at Mangalore - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Value of three reflectors for ditto - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Hire of men employed in putting up the lantern on the flagstaff, with landing charges and portorage - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Charges for oil, &c. on account of the flagstaff light - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Wages of two men attached to the flagstaff at Mangalore - - -	132 - -	132 - -	132 - -	132 - -	132 - -	132 - -	132 - -	44 - -
MALABAR:								
Pay of two men in charge of the light at Tellicherry - - -	- - -	- - -	- - -	- - -	- - -	52 - -	120 - -	120 - -
For making two iron cages to preserve the lanterns of the light at ditto - - -	- - -	- - -	- - -	- - -	- - -	6 - -	- - -	- - -
Oil, &c. for the light at ditto - - -	- - -	- - -	- - -	- - -	- - -	37 4 10	53 13 4	49 8 3
For striking the flagstaff at Tellicherry - - -	29 13 4	- - -	8 8 10	30 - 1	- - -	10 6 -	8 11 2	7 8 11
For rehoisting the flagstaff, overhauling the rigging, &c. at ditto - - -	8 10 5	8 1 2	- - -	9 4 -	7 13 1	8 8 10	9 10 8	7 8 11

* For further charges connected with the Gulf of Manaar, see under the head of Madras.

1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
- - -	- - -	- - -	- - -	- - -	- - -	187 6	- - -	- - -	187 6 -
- - -	200 - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	200 - -
- - -	- - -	- - -	1,716 7 7	- - -	- - -	- - -	- - -	- - -	1,716 7 7
- - -	- - -	- - -	- - -	- - -	500 - -	- - -	- - -	- - -	500 - -
67 14 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	67 14 -
- - -	160 - -	- - -	- - -	- - -	150 - -	70 - -	- - -	- - -	380 - -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	1,035 9 2½
933 7 2	170 14 4	- - -	4 12 -	- - -	2 1 11	3 - -	- - -	- - -	1,114 3 5
- - -	- - -	- - -	- - -	200 - -	66 3 7	- - -	- - -	- - -	266 3 7
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	137 - -
- - -	- - -	- - -	1,362 13 -	- - -	- - -	- - -	- - -	- - -	2,279 3 1½
809 - 6	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	809 - 6
<i>Rs.</i> 1,35,055 4 2									
- - -	- - -	- - -	- - -	555 6 -	- - -	- - -	- - -	- - -	1,314 1 10
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	30 - -
- - -	4 - -	3 8 -	3 8 -	- - -	5 10 -	4 8 -	4 4 -	4 - -	68 1 9
- - -	4 5 11	6 14 -	8 - -	6 8 -	5 - 2	- - -	3 7 4	9 4 4	77 9 9
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	76 10 -
- - -	129 14 11	- - -	6 12 2	- - -	6 4 -	- - -	2 - -	- - -	571 6 9
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	7 8 -
- - -	- - -	9 13 -	4 4 -	- - -	- - -	- - -	- - -	- - -	38 1 8
- - -	- - -	- - -	33 9 -	- - -	- - -	- - -	109 5 6	- - -	142 14 6
- - -	- - -	- - -	31 5 6	- - -	- - -	- - -	- - -	- - -	31 5 6
- - -	- - -	- - -	210 - -	- - -	- - -	- - -	- - -	- - -	210 - -
- - -	- - -	- - -	3 - 7	23 3 4	- - -	- - -	- - -	3 1 -	29 4 11
- - -	- - -	- - -	- - -	100 9 11	104 8 -	87 8 5	120 9 -	142 13 11	556 1 3
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	968 - -
<i>Rs.</i> 4,121 1 11									
120 - -	120 - -	120 - -	120 - -	120 - -	120 - -	118 1 -	120 - -	120 - -	1,370 1 -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	6 - -
72 11 3	58 12 1	63 1 4	65 8 4	60 14 4	131 4 -	119 - 1	58 - 2	85 15 6	855 13 7
12 10 -	10 7 2	10 5 1	10 14 4	11 4 -	9 12 10	18 5 8	- - -	8 6 6	187 1 11
5 10 11	11 1 6	- - -	6 11 9	4 3 7	5 7 7	5 8 8	4 13 6	9 1 7	112 4 2

Nature of the Charges, with the Names of the Districts in which they were incurred.	From May to April 1830-31.	1831-32.	1832-33.	1833-34.	1834-35.	1835-36.	1836-37.	1837-38.
	Rs. as p.	Rs. as p.	Rs. as p.	Rs. as p.	Rs. as p.	Rs. as p.	Rs. as p.	Rs. as p.
MALABAR—continued.								
For repairing the flagstaff, the masonry around it, flags, &c. at ditto - - -	2 1 7	8 7	85 15 -	285 7 10	2 - 11	- - -	- - -	21 14 -
Cost of a chest for securing the flags at ditto - - -	- - -	- - -	- - -	5 - -	- - -	- - -	- - -	- - -
For fixing buoys off ditto - -	- - -	- - -	- - -	- - -	- - -	- - -	3 3 2	- - -
Pay of two men in charge of the light at Calicut, for two months and a half - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Oil, &c. for the light at ditto -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of signal flags for ditto -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For making three national flags for Tellicherry, Calicut, and Cochin - - - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	136 8 -
For making a complete set of Maryatt's signals for Calicut -	- - -	- - -	- - -	- - -	138 7 2	- - -	- - -	- - -
Rent of a godown to hold the flag stores at Calicut - - -	60 - -	45 - -	60 - -	30 - -	59 5 4	60 - -	10 - -	- - -
For striking the flagstaff at ditto - - - - -	8 9 3	8 9 3	8 7 3	8 5 3	- - -	8 5 3	9 1 3	9 1 3
For rehoisting the flagstaff, overhauling the rigging, &c. at ditto - - - - -	- - -	- - -	- - -	38 - -	- 2 -	2 7 -	41 9 -	49 2 -
For repairing the flagstaff, flags, &c. &c. at ditto - - -	92 15 7	108 4 1	184 11 1	34 1 -	48 9 8	360 3 11	25 8 -	203 15 -
Incurred for pulling down the flagstaff at Calicut - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Amount advanced for the erec- tion of a flagstaff at ditto -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Pay of two men in charge of the light at Cochin - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Oil, &c., for the light at ditto -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Incurred for advertising the Cochin light in the Calcutta Gazette - - - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Boat-hire for securing buoys, and recovering their an- chors, for the caulking, re- pairing, &c. of buoys off Cochin - - - - -	58 4 -	204 1 3	56 6 4	376 10 -	- - -	134 10 5	129 15 3	60 5 -
Pay of a syrang in charge of the flagstaff at Cochin - - -	105 - -	105 - -	105 - -	105 - -	80 - -	- - -	- - -	- - -
Cost of a chest for securing the flags at ditto - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For striking the flagstaff at ditto - - - - -	5 14 8	5 12 10	5 8 -	5 8 -	5 8 -	6 5 5	6 5 -	6 5 -
For rehoisting the flagstaff, setting up the rigging, &c. at ditto - - - - -	5 8 11	5 9 2	9 5 2	- - -	- - -	7 1 4	17 11 -	7 3 -
For repairing the flagstaff, flags, &c., and whitewashing the town, &c. &c. at Cochin -	- - -	21 6 5	- - -	79 13 6	95 5 4	- - -	20 12 -	- - -
Pay of two men in charge of the light at Cannanore - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Oil, &c. for the light at ditto -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Value of a spy-glass for the flagstaff at Calicut - - -	- - -	- - -	30 - -	- - -	- - -	- - -	- - -	- - -
MADRAS :								
(Particulars of marine dis- bursements as given in the accounts of the boat paymas- ter, the late marine accountant, and the sub-treasurer of Fort St. George.)								
Wages of the men attached to the flagstaff at Pulicat - - -	240 - -	240 - -	240 - -	240 - -	186 13 6	- - -	- - -	- - -
Pay of the servants in charge of the marine lighthouse - -	378 - -	378 - -	378 - -	378 - -	378 - -	378 - -	373 - -	376 - -
Contingent charges, including oil, &c. for the Madras lighthouse - - - - -	1,179 11 11	1,054 5 9	882 7 3	1,761 11 -	1,195 9 -	- - -	- - -	- - -
Cost of articles purchased and supplied for the flagstaff at Negapatam - - - - -	63 8 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
For sewing a union jack for the flagstaff at Pulicat - - -	- - -	3 - -	- - -	- - -	- - -	- - -	- - -	- - -
Hire for conveying a barrel of tar and the union jack to Pulicat - - - - -	- - -	14 8 -	- - -	- - -	- - -	- - -	- - -	- - -
Cost of a new set of signals for the Madras Port - - -	- - -	- - -	31 8 -	- - -	- - -	- - -	- - -	- - -
Cost of a new set of Honour- able Company's transport signals for the Madras Port -	- - -	- - -	17 - -	- - -	- - -	- - -	- - -	- - -
Cost of four sets of Marryatt's signals for transmission to Masulipatam, Cuddalore, Cochin, and Mangalore - - -	- - -	- - -	- - -	100 8 -	- - -	- - -	- - -	- - -

1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
- - -	- 9 9	- 12 -	- - -	- - -	- - -	52 8 -	16 8 8	- - -	476 7 4
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	5 - -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	3 3 2
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14 8 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	16 3 5	16 3 5
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- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	136 8 -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	138 7 2
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21 13 3	12 12 -	12 8 -	12 8 -	12 8 -	12 8 -	5 - -	- - -	- - -	150 - -
2 12 -	27 4 -	3 4 -	2 12 -	2 12 -	2 12 -	2 6 4	- - -	- - -	175 2 4
83 2 -	86 10 -	66 4 -	41 8 -	129 6 -	66 6 -	82 5 8	37 8 -	- 12 10	1,652 2 10
- - -	- - -	- - -	- - -	- - -	- - -	- - -	238 12 -	- - -	238 12 -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	62 - -	- - -	62 - -
10 - -	120 - -	120 - -	120 - -	120 - -	120 - -	120 - -	120 - -	120 - -	970 - -
10 5 11	61 - -	62 13 11	60 - -	60 - -	60 - -	61 - -	60 - -	60 - -	495 3 10
- - -	- - -	- - -	- - -	- - -	- - -	31 4 9	- - -	- - -	31 4 9
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38 10 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	12 11 4	1,071 9 7
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	500 - -
- - -	6 - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	6 - -
18 10 -	- - -	8 15 10	8 5 -	17 5 4	8 3 -	7 11 -	7 11 -	11 11 -	135 11 1
10 6 -	12 1 9	10 3 -	11 2 8	8 2 -	24 12 6	8 2 -	8 11 -	8 11 -	154 10 6
379 - -	6 4 -	22 8 -	26 15 11	- - -	93 10 5	8 9 8	51 10 6	99 12 -	905 11 9
- - -	- - -	- - -	- - -	- - -	64 13 5	120 - -	120 - -	120 - -	424 13 5
- - -	- - -	- - -	- - -	- - -	28 6 8	80 6 -	125 3 6	119 7 -	353 7 2
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	30 - -
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- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	1,146 13 6
315 - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	3,332 - -
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	6,073 13 3
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1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
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- - -	8 8 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	12 - -
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(continued)

Nature of the Charges, with the Names of the Districts in which they were incurred.	From May to April 1830-31.	1831-32.	1832-33.	1833-34.	1834-35.	1835-36.	1836-37.	1837-38.
MADRAS—continued.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.	Rs. as. p.
For shipping a lantern on a dhoney for Negapatam -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for four bundles of rope sent to Coringa for the flagstaff - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for three cases of lan- terns sent to Tellicherry -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for three lanterns sent to Malabar - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Salary of the light-keeper at Negapatam for one month and five days - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for a signal lantern sent to Masulipatam -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for two cases of lan- tern stores sent to Manga- lore - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Paid for observations made of the run of the sea and set of the tides in the north- east monsoon at Madras -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Survey of the Gulf of Ma- naar. (Items given in the sub-treasurer's accounts.)	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Abstract of Lieutenant F. T. Powell and R. E. Bentlam, esq., of the Honourable Com- pany's surveying schooner "Royal Tiger," on account of pay issued to the officers of the surveying vessels, and for other expenses, from September 1837 to July 1838 - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Amount of bills of sundry ex- penses incurred at Bombay on account of the Honour- able Company's surveying tender "Royal Tiger," and other vessels engaged in the Manaar survey during 1837- 38 and 1838-39, and ad- justed in the civil charges -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Bill of the Colombo Commis- sariat for provisions sup- plied to the crew at Manaar	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Account current of Lieutenant Ethersey, of the Honour- able Company's surveying schooner "Shannon," for sundry expenses incurred in 1837-38 and 1838-39 -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Abstract signed by Lieutenant Powell and Lieutenant Ethersey, of sundry expenses connected with the Honour- able Company's surveying vessels in 1838-39, and ad- justed in the civil charges, 1841-42 - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Salaries of the gentlemen in charge of the Manaar survey	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Mess money - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Hire of vessels employed in the Manaar survey - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Wages of the crew engaged for ditto - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight for two buoys and two anchors sent to Paumbem -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Paid at Madras for incidental expenses of the Manaar sur- vey - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Paid on account of an apothec- ary and an ordnance arti- ficer attached to the survey	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Freight, &c., for lantern stores and grapnels sent to Paum- bem - - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

Fort St. George, Accountant-General's Office,
27 March 1850.

1838-39.	1839-40.	1840-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	GRAND TOTAL.
<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>
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34,898 6 1	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	34,898 6 1
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340 - -	235 6 11	- - -	- - -	- - -	- - -	1,470 - -	735 11 5	- - -	2,781 2 4
- - -	- - -	- - -	- - -	- - -	- - -	90 - -	45 - -	- - -	135 - -
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- - -	- - -	- - -	- - -	- - -	- - -	600 - -	77 6 8	- - -	677 6 8
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- - -	- - -	- - -	- - -	- - -	- - -	2 8 -	77 11 10	- - -	80 3 10
- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	Rs.	1,45,139 8 3

(signed) T. V. Stonhouse, Accountant-General.

ABSTRACT.

												GRAND TOTAL.
												<i>Rs. as. p.</i>
Rajahmundry	-	-	-	-	-	-	-	-	-	-	-	28,491 13 5
Masulipatam	-	-	-	-	-	-	-	-	-	-	-	2,749 5 3
Nellore	-	-	-	-	-	-	-	-	-	-	-	179 11 5
Chingleput	-	-	-	-	-	-	-	-	-	-	-	1,261 12 9
North Arcot	-	-	-	-	-	-	-	-	-	-	-	524 6 7
South Arcot	-	-	-	-	-	-	-	-	-	-	-	3,432 15 1
Tanjore	-	-	-	-	-	-	-	-	-	-	-	3,506 3 11
Madura	-	-	-	-	-	-	-	-	-	-	-	17,275 2 6
Tinnevelly	-	-	-	-	-	-	-	-	-	-	-	2,178 11 -
Madura and Tinnevelly, in connexion with the Survey of the Gulf of Manaar												1,35,055 4 2
Canara	-	-	-	-	-	-	-	-	-	-	-	4,121 1 11
Malabar	-	-	-	-	-	-	-	-	-	-	-	11,027 8 4
Madras	-	-	-	-	-	-	-	-	-	-	-	1,45,139 8 3
GRAND TOTAL - - - £.												3,54,943 8 7

(signed) *T. V. Stonhouse,*
Accountant-General.

Fort St. George, Accountant-General's Office,
27 March 1850.

(A true copy.)

(signed) *H. C. Montgomery,*
Chief Secretary.

No. 2.

STATEMENT showing the Cost of Construction, and the Average Annual Charges of Maintenance of the several LIGHTHOUSES, LIGHT-VESSELS, BEACONS and BUOYS, under the *Bombay* Presidency.

	Cost of Construction.	CHARGES OF MAINTENANCE.			REMARKS.
		Pay and Provisions.	Stores and Repairs, &c.	Total Amount of Average Annual Charges.	
LIGHTS :	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	
One lighthouse at Colaba -	45,523	4,527	2,123	6,650	{ This includes the value of ground, outhouses, and its appurtenances, &c., of the Colaba light- house.
One lighthouse at Taptee River	7,635	1,326	-	1,326	
One lighthouse at Peerum -	5,023				
One inner light-vessel (the schooner "Shannon"), sta- tioned throughout the year on the Sunken Rock -	28,031	1,001	1,329	2,330	
One outer light-vessel (the "Co- laba"), stationed throughout the year - - - -	61,272	6,051	5,526	11,577	
BEACONS :					
One beacon on the Oyster Rock at Colaba - - - -	1,416	}			
One beacon on the Sunken Rock	2,069				
One beacon in the sea at Maza- gon - - - -	150				
One beacon (wooden) on the Dolphin Rock - - - -	500				
BUOYS :					
One buoy fairway (wooden), at the entrance of the Bombay Harbour - - - -	1,539	}	249	249	
One buoy (circular), for the Sunken Rock - - - -	600				
Two can buoys for the Middle Ground Shoal - - - -	196				
One can buoy for the Flagstaff Shoal - - - -	583				
One can buoy for the Northern Patch - - - -		}			
One buoy for the wreck of the ship "Tyne" - - - -					
One buoy for the wreck of the barque "Meca" - - - -	*				
One buoy for the wreck of the ship "Cornwallis" - - - -					
One buoy for the wreck of the ship "Tauze" - - - -					
	1,54,537	12,905	9,227	22,132	* The cost of construc- tion cannot be distin- guished, the same having been included with the General Marine Charges.

Bombay Castle, Accountant-General's Office,
26 April 1849.

(signed) *E. E. Elliot*,
Accountant-General.

(True copy.)

(signed) *P. M. Melvill*, Lieutenant-Colonel,
Secretary to Government.

No. 3.

STATEMENT of the Pay, &c. of the Officer in Charge of the Indian Navy Draftsman's Department, and that of his Establishment, including Cost of Stores, &c. from the Year 1822-23 to 1846-47.

Y E A R.	Commander.	Lieutenant.	Native Draftsman.	Purrovoc.	Amount of Pay, &c.	Amount of Stores, &c.	Total of each Year.	REMARKS.
					<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	<i>Rs. as. p.</i>	
1822-23	-	1	-	-	912 - -	- - -	912 - -	There do not appear to have been any charges on this account in the years 1820-21 and 1821-22.
1823-24	-	1	-	-	4,380 - -	153 12 7	4,533 12 7	
1824-25	-	1	-	-	4,680 - -	82 5 4	4,762 5 4	
1825-26	-	1	2	-	4,830 - -	192 11 11	5,022 11 11	
1826-27	-	1	2	-	5,400 - -	- - -	5,400 - -	
1827-28	-	1	2	-	5,400 - -	84 - -	5,484 - -	
1828-29	-	1	2	-	5,400 - -	83 15 -	5,443 15 -	
1829-30	-	1	2	-	5,400 - -	30 3 8	5,430 3 8	
1830-31	-	1	2	-	5,400 - -	8 2 4	5,408 2 4	
1831-32	-	1	2	-	7,044 - -	711 - -	7,755 - -	
1832-33	-	1	2	-	7,404 - -	17 5 -	7,421 5 -	
1833-34	1	-	2	-	7,920 - -	6 12 -	7,926 12 -	
1834-35	-	1	2	-	12,264 - -	77 9 -	12,341 9 -	
1835-36	-	1	2	-	12,264 - -	93 6 -	12,357 6 -	
1836-37	-	1	2	-	5,760 - -	- - -	5,760 - -	
1837-38	1	-	2	-	5,760 - -	356 15 -	6,116 15 -	
1838-39	-	1	2	1	6,120 - -	64 5 -	6,184 5 -	
1839-40	-	1	2	1	5,040 - -	25 15 -	5,065 15 -	
1840-41	-	1	2	1	5,040 - -	143 4 -	5,183 4 -	
1841-42	-	1	2	1	5,040 - -	374 11 -	5,414 11 -	
1842-43	-	1	2	-	4,680 - -	964 2 -	5,644 2 -	
1843-44	-	1	2	-	4,680 - -	391 14 -	5,071 14 -	
1844-45	-	1	2	-	4,680 - -	517 5 -	5,197 5 -	
1845-46	-	1	2	-	4,680 - -	491 8 -	5,171 8 -	
1846-47	1	-	2	-	4,680 - -	696 4 -	5,376 4 -	
TOTAL - -	3	22	44	4	1,44,858 - -	5,527 5 10	1,50,385 5 10	

(signed) *E. E. Elliot*,
Accountant-General.

Bombay Castle, Accountant-General's Office,
26 April 1849.

(True copy.)

(signed) *P. M. Melvill*, Lieutenant-Colonel,
Secretary to Government.

No. 4.

LIST of LIGHTHOUSES, FLOATING LIGHTS, BEACONS, BUOYS, or other Land or Sea Marks, under the Presidency of *Bombay*.

Works, and where situated.	No.	Original Cost.	DESCRIPTION.
LIGHTHOUSES :			
Colaba, Bombay - -	1	15,419 1 11	- - Round ; diameter $17\frac{1}{2}$ feet, height $60\frac{1}{4}$ feet ; walls of stone and choonam ; winding stairs, gallery, and flagstaff of teakwood ; has a light on the revolving principle, which exhibits its greatest light every two minutes.
Perim (near Surat) - -	1	unknown -	- - No information in the Board of Public Works.
BEACONS :			
Oyster Rock, Bombay Harbour.	1	1,530 15 6	- - Round ; diameter $5\frac{1}{2}$ feet, height $27\frac{1}{2}$ feet ; stone and choonam, plastered.
Dolphin Rock, Bombay Harbour.	1	2,391 14 3	- - A frame of teakwood, filled with stone ; length $26\frac{1}{2}$ feet, diameter $26\frac{1}{2}$ feet, height $26\frac{1}{2}$ feet.
Near Mazagon Dock, Bombay Harbour.	1	150 - -	- - Round ; diameter 6 feet, height 20 feet ; brick and choonam, plastered.
Port of Vingorla - -	1	unknown -	- - No information in the Board of Public Works.
Munhora Point, Kurrachee	1	unknown -	- - No information in the Board of Public Works.
Vaux's Tomb, Surat -	1	unknown -	- - No information in the Board of Public Works.
Floating Lights - - } Buoys - - - } Land or Sea Marks - - }	- - } - - - } - - }	- - } - - - } - - }	- - No information in the Board of Public Works.
Applications for erecting Lighthouses and Beacons.	- -	- - -	- - The Board of Public Works are aware of none.

Note.—It is known that there are several creeks and harbours on the coast, where beacons, &c. exist, but no details connected with them are on record.

(signed) *N. H. Thornbury*, Captain,
Secretary Military Board.

Bombay, Military Board Office,
8 August 1848.

(True copy.)

(signed) *P. M. Melvill*, Lieut.-Colonel,
Secretary to Government.

No. 5.

(No. 24 of 1849.)

From Commander *C. W. Montriau*, I. N., Draftsman Indian Navy, in charge of Observatory, to Commodore *Stephen Lushington*, Commander-in-Chief Indian Navy.

Sir,

I HAVE the honour to acknowledge the receipt of a memorandum of your secretary, No. 1,336, dated 19th August 1848, forwarding for my information a letter from the Chief Secretary to Government, dated 16th August 1848, enclosing a copy of the Orders of the Honourable the House of Commons relating to the returns required of lighthouses, marine surveys, charts, &c., and directing me to report thereon.

I have also to acknowledge the receipt of a memorandum of your secretary, No. 260, dated 1st February 1849, enclosing a letter from Lieutenant-colonel Melvill, Secretary to Government, which is herewith returned, and have, with reference to it, to state, that the delay in furnishing the report required has been caused by the difficulty of procuring accurate official information for the earlier periods of inquiry.

I have now the honour to forward a report, which is as full and complete as I have, from the sources of information at my disposal, been able to make, and it will I trust meet in a great measure the objects for which the information has been called for.

The surveys executed by the officers of the Indian navy from the year 1820 to 1847, the period embraced in the Parliamentary inquiries, are shown in the skeleton map forwarded with this report in duplicate; they comprise, in the first place, those made under the orders of the Bombay Government, to the westward of Cape Comorin; that part of the east coast of Africa, from Ras Hafoon to Ras Sejean, on the western side of the entrance to the Straits of Babelmandel; the Red Sea, with its numerous islands and shoals, including the Gulfs of Suez and Akabah; the Island of Socotra and adjacent islands; the S. E. coast of Arabia, from Cape Babelmandel, on the eastern side of the entrance to the Straits, to Cape Museldom, western side of the entrance to the Persian Gulf, the part shaded blue in the skeleton map, from Ras-el-Had to Muscat, being finished this year (1849); the Koria Moorla Islands, and the Island of Mazeira, laying off the S. E. coast of Arabia; the Persian Gulf, with its islands and shoals; the Tigris, Euphrates, and Kuran Rivers, with portions of the countries along their banks. In this survey, by a series of carefully conducted chronometric measurements, the shores of the Mediterranean Sea and those of the Persian Gulf have been connected. The coast from Cape Jask, eastern side of entrance to the Persian Gulf, to Kurrachee in Scinde; the greater part of the coast of Scinde, the remaining portion will be completed this year (1849); the Indus River, with its embouchures; portions of the Chenab, Ravee, Jhelum, and Sutlej Rivers; a partial survey of part of the Gulf of Cutch; the Kattiwar coast from Dwarka to Diu-head, from thence to Perim Island; the Gulf of Cambay, with portions of the Nerbudda and Taptee Rivers to Surat, together with the Malacca banks; coast of the Konkan from Dunnoo to Arnol Island, and from Bombay to Algoada (Goa), with the rivers; detached portions of the Malabar coast; the Laccadive and Maldive Islands; Angria's Bank, the Basses de Pedro, and the various shoals in its vicinity, and a partial survey of the Saya de Malha Banks. Secondly, the surveys to the eastward of Cape Comorin—first, those executed under the orders of the Madras Government, comprise the coast of Ceylon from Colombo to Galle, part of the coast of Madura, western side of Palk's Straits to Point Calimere, Adam's Bridge, the Island of Ramisseram and Manaar, the Santipilly Rocks and Mootapilly Shoal on the Coromandel coast. Lastly, the surveys made under the orders of the Supreme Government, Bengal, comprising the Pulicat and Armegon Shoals, with part of the Coromandel coast, from Ennore to Armegon Hill; the coasts of India, from False Point, Orixá coast, Bay of Bengal to Cape Negrais, including in that line of coast the River Hooghly up to Calcutta, the Sand-heads, the coast line of the Sunderbunds of Bengal,

Bengal, with their numerous islands and creeks, forming the delta of the Ganges, and the shoals off them, carrying the soundings down to $20^{\circ} 58'$ north; the coast of Chittagong and Arracan, with the islands of Kamree and Cheduba, together with the various small islands and shoals off those coasts, with part of the inland navigation of the Arracan province; the coast of Ava, from the Sitang River, in latitude $16^{\circ} 36'$ north, to about $8^{\circ} 40'$ north; the Rangoon, Tavoy, and other rivers; the Moscos Islands; the numerous islands, rocks and shoals forming the Mergui Archipelago; the east coast of Sumatra, from Diamond Point to Po. Panjore; the harbour of Singapore, and adjacent islands off it; the Straits of Durian, and the passages from Tanjong Bon and Pulo Barellah to the southern entrance of the Straits of Durian.

Several surveys of various localities have also been made from time to time by persons not belonging to the regular service, under the orders of the Bengal and Madras Governments, of which I have no details. The coast from Cape Comorin to Tutacorin was surveyed by a Mr. Franklin, by order of the Madras Government, the chart of which has been published by the hydrographer to the East India Company.

The extent of coast surveyed from 1820 to 1847 and 1848, not including the surveys of the groups of islands, &c., amounts to upwards of eleven thousand miles; during the above-mentioned period the surveys in progress were frequently interrupted by various causes, such as the Burmese and China wars, &c.; also during the prevalence of the south-west monsoon, in many instances, the surveying operations could not be carried on.

The following tabular statements will exhibit the number of officers of the various grades actually borne on the lists of the Indian navy, number absent, number employed on shore in staff situations, and on survey; the column marked number of officers employed on survey, includes, as well as those belonging to the regular surveying vessels, those officers of the Indian navy employed in Bengal on surveying duties under the orders of the Supreme Government, and those on detached surveys, likewise the number of each grade of officers thus employed; number of vessels marked as engaged on survey, were those actually belonging to the Indian navy; besides these, other vessels were employed on the same duties in Bengal not borne on the lists of the Indian navy; latterly, they were furnished from the Bengal pilot-service, as required by the officer of the Indian navy holding the situation of marine surveyor-general under the Supreme Government; they were principally officered from the pilot service; other officers from the merchant service were also engaged from time to time, the Bombay Government being unable to spare the requisite number of officers to the Bengal Government, to carry on the duties of the vessels. Having no returns of the surveying establishments under the marine surveyor-general, I am unable to furnish any statement as to the number of officers (other than those belonging to the Indian navy) employed on survey to the eastward under the orders of the Bengal Government.

The medical officers are not included in the following tabular statements, as that grade of officers when required for the service of the Indian navy afloat are lent from the army; those employed on board the surveying vessels have in repeated instances rendered the most valuable assistance in the subordinate subjects of scientific inquiry connected with the various surveys in progress.

The acting masters and second masters are not regularly appointed from home to the Indian navy, but are taken from the merchant service; they were first engaged by the local government, and brought on the lists as a class of supernumerary officers in 1840; they were principally employed in the packets and on board the steamers in the Indus flotilla; only two of the above class of officers have been employed on board the surveying vessels, but that only since the year 1844.

Table No. 2, with the exception of the columns marked number of officers and vessels employed on survey, which shows the number that were actually employed on that duty at various periods during each year, exhibits the general state of the service in the month of January of the respective years.

TABLE No. 1.

TABLE showing the Number of each Grade of OFFICERS of the Indian Navy employed on Surveying Duties during the following Years :

YEARS.	Captains.	Commanders.	Lieutenants.	Mates and Midshipmen.	Masters.	Pursers.	Clerks.	TOTAL.
1821 - -	1	2	6	5	- -	- -	- -	14
1822 - -	- -	1	6	6	- -	- -	- -	13
1823 - -	1	1	12	6	- -	- -	- -	20
1824 - -	1	1	6	7	- -	- -	- -	15
* 1825 - -	2	- -	8	8	- -	- -	- -	18
1826 - -	2	- -	3	3	- -	- -	- -	8
1827 - -	2	- -	9	5	- -	- -	- -	16
1828 - -	1	- -	8	12	- -	1	- -	22
1829 - -	1	- -	8	13	- -	1	4	27
1830 - -	1	1	4	13	- -	2	3	24
1831 - -	1	1	7	9	- -	1	3	22
1832 - -	1	1	10	10	- -	2	2	26
1833 - -	1	1	9	9	- -	1	3	24
1834 - -	- -	2	9	11	- -	2	2	26
1835 - -	- -	2	8	12	- -	1	2	25
1836 - -	- -	2	11	11	- -	1	1	26
1837 - -	- -	2	9	13	- -	1	1	26
1838 - -	- -	2	8	16	- -	2	- -	28
1839 - -	- -	1	7	8	- -	1	- -	17
1840 - -	- -	2	2	1	- -	- -	- -	5
1841 - -	- -	1	6	6	- -	1	2	16
1842 - -	1	1	7	4	- -	2	- -	15
1843 - -	- -	- -	1	- -	- -	- -	- -	1
1844 - -	- -	1	2	15	2	- -	3	23
1845 - -	- -	1	2	12	1	- -	2	18
1846 - -	- -	1	4	21	1	- -	3	30
1847 - -	- -	- -	5	14	2	- -	2	23
1848 - -	- -	- -	4	11	1	- -	2	18

* During the greater part of 1824, and in 1825 and 1826, the officers of the Indian navy employed in the surveying vessels in Bengal were engaged in the Burmese war, but although the regular surveys were suspended, several detached surveys were executed by them, which is the reason that I have not omitted them in those years.

TABLE No. 2.

TABLE showing the NUMBER of each Grade of Officers borne on the Lists of the Indian Navy, Present, Absent, and Employed on Survey, during various Periods, from 1821 to 1848, together with the Number of Vessels, &c.

YEARS.	Commodores.	Senior Captains.	Junior Captains.	Commanders.	First Lieutenants.	Second Lieutenants.	Senior Midshipmen.	Midshipmen.	Purser.	Captains' Clerks.	Ships' Clerks.	Acting Masters.	Second Masters.	Total borne of all Grades.	Employed on Shore in Staff Appointments.	Absent Sick, on Furlough, &c.	Available for Service Afloat.	Employed on Survey.	Number of Vessels.	Number of Vessels employed on Survey.
1821	1	8	8	8	28	21	24	24	—	—	—	—	—	122	21	18	83	14	17	2
1822	1	8	8	8	28	19	22	31	—	—	—	—	—	125	23	20	82	13	16	2
1823	1	8	8	8	28	20	16	35	—	—	—	—	—	124	23	14	87	20	15	2
1824	1	8	8	8	28	20	10	36	—	—	—	—	—	119	18	16	85	15	14	2
1825	1	12	12	—	29	22	6	30	—	—	—	—	—	112	13	14	85	18	15	2
1826	1	12	12	—	29	21	5	27	—	—	—	—	—	107	13	18	76	8	14	1
1827	1	12	12	—	30	23	5	23	—	—	—	—	—	105	13	24	68	16	12	1
1828	1	11	12	—	30	22	3	30	—	—	—	—	—	109	15	19	75	22	11	2
1829	—	7	—	10	48	—	—	58	9	8	—	—	—	140	7	21	112	27	11	2
1830	—	9	—	9	46	—	—	67	11	14	—	—	—	156	10	21	125	24	14	2
1831	—	9	—	12	46	—	—	68	11	14	—	—	—	160	5	30	125	22	12	2
1832	—	7	—	12	46	—	—	69	11	13	—	—	—	158	4	25	129	26	13	2
1833	—	7	—	12	46	—	—	69	11	14	—	—	—	159	7	29	123	24	13	2
1834	—	7	—	12	46	—	—	60	11	6	—	—	—	142	6	29	107	26	17	5
1835	—	7	—	12	46	—	—	57	12	6	—	—	—	145	7	20	118	25	17	5
1836	—	7	—	12	46	—	—	48	12	6	—	—	—	137	7	19	111	26	20	5
1837	—	7	—	12	46	—	—	43	12	7	—	—	—	134	9	23	102	26	19	4
1838	—	7	—	12	46	—	—	39	12	6	—	—	—	126	8	19	99	28	22	6
1839	—	7	—	12	41	—	—	34	12	6	—	—	—	116	8	19	89	17	24	5
1840	—	4	—	9	40	—	—	50	12	14	—	—	—	138	10	16	112	5	29	—
1841	—	4	—	10	40	—	—	59	12	6	—	5	4	168	10	16	142	16	30	1
1842	—	7	—	13	42	—	—	68	12	6	—	15	9	189	14	16	159	15	39	1
1843	—	6	—	12	42	—	—	90	11	6	—	14	21	214	9	32	173	1	38	—
1844	—	6	—	12	41	—	—	92	12	6	—	15	27	227	11	31	185	23	35	3
1845	—	6	—	12	44	—	mates.	83	12	6	—	18	30	231	13	33	185	18	34	3
1846	—	6	—	12	45	—	4	88	12	6	—	17	34	247	14	36	197	30	38	4
1847	—	6	—	12	47	—	9	73	12	6	—	16	28	234	13	31	190	23	37	4
1848	—	8	—	16	61	—	18	77	14	11	—	14	22	238	11	44	183	18	42	4

The column marked "Number of Vessels," includes the steamers, as well as those employed on the Indus and Enphrates, the sailing vessels in and out of commission, &c.

* The vessels marked as employed on survey these years, were only engaged for a short period on surveying duties, and were not commissioned for that purpose.

The following are the vessels belonging to the Indian navy which were employed on surveying duties at various periods, from 1820 to 1848 :—

					Tons.
Discovery	-	-	ship	-	of 289
Benares	-	-	ditto	-	of 268
Psyche	-	-	brig	-	of 180 ³⁶ ₇₄
Palinurus	-	-	ditto	-	of 192 ⁴² ₉₄
Taptee	-	-	ditto	-	of 189
Shannon	-	-	schooner	-	of 87
Royal Tiger	-	-	ditto	-	of 120
Nerbudda	-	-	cutter	-	of 49 ⁸¹ ₉₄
Cardiya	-	-	ditto	-	of 27
Maldiva	-	-	ditto	-	of 23 ⁴² ₉₄

The “Psyche” was sold out of the service in July 1825, the “Discovery” in May 1828, and the “Benares” in 1838.

From April 1839 until February 1844, no vessels were employed on survey, with the exception of the “Euphrates,” for a short period in 1841, on the Abyssinian coast; and the “Shannon” for one month in 1842, employed surveying the harbour of Soonmeanee, coast of Mekran. The steamers belonging to the Euphrates flotilla not being expressly employed on surveying duties, are not included in the number of the ships so engaged; but the officers of the Indian navy belonging to them are, as they were actively employed on such duties in addition to their other paramount ones. Since February 1844, the “Palinurus,” “Taptee,” “Nerbudda” and “Maldiva” have been employed (except during the strength of the south-west monsoon) up to the present time, as surveying vessels; the average number of officers and men employed on board of them during each year amounts to 180 in number.

With reference to the information required regarding the various hydrographic departments of the East India Company existing at present in England, and at the various Presidencies in India, it will of course be furnished by the various departments that may be classed under those heads, such as the Surveyor-general of India in Bengal, the hydrographer to the East India Company at home, &c.; but there is not, as I am aware, any hydrographic department expressly belonging to the marine, except that of the office of Indian Navy Draftsman, at Bombay, the situation of marine surveyor-general at Bengal having, I believe, been done away with, on the retirement of Captain Richard Lloyd, Indian navy.

The establishment of the Indian Navy Draftsman’s Office, Bombay, consists of the following persons :—

One officer of the Indian navy, entitled Draftsman Indian Navy, in charge of the office, whose duties are, to have charge of all surveys, charts, astronomical and mathematical instruments and compasses belonging to the Indian navy, to keep accounts of the receipts and issues of charts, chronometers, &c. from and to the various vessels and departments under Government, and to be available for surveys; he is likewise required to cause copies of all the charts of the several surveys in progress to be made for transmission to the hydrographic department of the East India Company in England, and also of the various plans, charts, memoirs, &c. required by Government; one writer to assist in keeping the accounts, and in copying letters, &c.; and two native draftsmen for the purpose of copying charts and plans.

The pay of the establishment is as follows :—

One officer of the Indian Navy, in addition to the net pay of his rank	-	-	-	-	-	-	-	-	-	-	Rs.
One native writer	-	-	-	-	-	-	-	-	-	-	300
Two native draftsmen at 45 rupees each, per mensem, is	-	-	-	-	-	-	-	-	-	-	30
											90
Total Pay of the Establishment per Mensem, is											420

Per
mensem.

The office is placed under the orders of the Commodore, Commander-in-chief of the Indian navy, to whom all reports and applications relating to it are made.

The

With reference to the information required as to the cost of erection of the several lighthouses, expenses of maintenance of lights, number of buoys, beacons, &c. in the Eastern Seas, not having any returns available in the draftsman's office, I am unable to give it, but the various departments to which the above matters belong will of course have no difficulty in furnishing the requisite information.

The lighthouse at Bombay is situated on the extreme low rocky point forming the northern entrance point of the harbour; it is kept white; the walls are of rough masonry, with a winding wooden stair and wooden gallery; the frame of the lantern is of copper, glazed with plate-glass, 64 in number, and roofed with copper. The light until 1847 was a fixed one; the lamps, 15 in number, with oval concave reflectors, were Robinson's and Wilkins's patent self-feeding oil lamps. On the 1st of February 1847 the light was changed into a revolving one; it is now fitted with Wilkinson's patent lamps and reflectors, and revolves once in six minutes, showing three light and three dark faces.

The rocky point on which the lighthouse is erected is about 70 feet above the level of the sea (the level was taken at low-water spring tides; the mean rise and fall of the tide at Bombay on the springs is about 18 feet); the round tower of the lighthouse, including the polygonal pedestal on which it stands, which is 5 feet 3 inches high, is 65 feet 6 inches in height up to the floor of the lantern; the latter, including roof, is 18 feet 9 inches, and chimney 5 feet, making the total height of lighthouse from base to top of chimney 89 feet 3 inches; elevation above the sea about 159 feet.

The height of the lighthouse, Madras, from the ground to the vane is 125 feet, light above the ground 117 feet, and elevation of the light above the mean level of the sea about 130 feet; it is of the flashing description, and the duration of the flashes to that of the eclipses or dark periods is in the ratio of two to three; but as the nature of the motion is reciprocating instead of rotatory, the above ratio merely expresses the average proportion of the light and dark intervals, which are themselves variable according to the position of the spectator. The rapidity of movement is so adjusted that the duration of the flashes will vary from 0" to 48", and that of the eclipses from 0" to 72", the sums of the duration of light and darkness bearing however in every position the constant ratio of 2' to 3'. The above account of the Madras light is abridged from the notice published by the Marine Board, Madras, in October 1843.

The lighthouse on False Point, Bay of Bengal, "stands in latitude, north $20^{\circ} 19' 25''$, and longitude $86^{\circ} 48' 8''$ east, rising 120 feet above high-water mark, and is coloured dark red or reddish brown, with a large white star in the centre; the building may be seen in clear weather by day, and the light (formed of Argand lamps with reflectors) by night, from 18 to 20 miles, at a height of 12 or 15 feet from the level of the sea."—*Vide* notice published by the Bengal Government, 21st April 1840.

The light at Pondicherry is about 89 feet above the level of the sea, and is a fixed light, and may be seen in clear weather from a ship's poop from a distance of 16 or 17 miles; the light is, I believe, on the same principle as that adopted in the generality of the French lighthouses (the dioptric principle).

The light at Colombo is about 97 feet above the level of the sea, and is a brilliant fixed light. The lighthouse at Algoada is situated on the level headland which is of moderate height, forming the northern extremity of Goa Bay; it is built of masonry, kept white, and is about 240 feet above the level of the sea. The lighthouse on the northern side of the entrance to Arracan River, on Faqueer's Point, is a small building, with a fixed red light. All the lights before enumerated, whether placed in lighthouses, light-vessels, on beacons or flagstaffs, with the exception of Pondicherry and Mandavie, which latter place, as will be seen in the description hereinafter given, scarcely merits to be classed with them, are, I believe, on the catoptric principle; those at Madras, Cochin, and Coringa are constructed after the plans of Captain J. T. Smith of the Madras Engineers, full details of which are contained in the fifth volume of Professional Papers of the Corps of Royal Engineers; the same officer has also constructed a light for the Port of Masulipatam, but I have no account of its erection. Circulars having been sent from home to the Government of India, containing questions embracing every particular connected with the lighthouses and lights in India, full information will be furnished by the several departments under which the

lights

lights are placed, which, as I have before mentioned, from my not having the necessary documents available, I am unable to give.

The light at Mandavie is placed on the S. W. bastion of the fort, 90 feet above the level of the sea, and according to the report of Lieutenant Greive, of the Indian Navy, cannot be seen more than six or seven miles under the most favourable circumstances; the lantern, which is glazed on all sides, containing only four glass tumblers with floating wicks, and without reflectors of any kind; it has been recommended, I believe, to the Rao of Cutch to substitute good lamps and reflectors for the above.

In the list of light-vessels previously given, I find I have omitted to mention that the Peninsular and Oriental Steam Navigation Company have a small light-vessel stationed at the anchorage off Suez, the light of which is shown whenever the mails are expected.

A lighthouse has been recommended to be placed on the small island of Kundaree, or Kenery, situated about 11 miles to the southward of the Bombay lighthouse; the light proposed to be shown is a brilliant red one, in order to obviate the danger of any mistake being made between the lights placed at so short a distance from each other; the plans regarding it are under the consideration of Government. Lighthouses have likewise been recommended to be erected on various localities, amongst which are the Great Basses, off Ceylon; also on a point of the Island of Ceylon, bearing N. 60°, 30' W. from the Little Basses, and about six miles to the westward of the Kombochan River; and on other points of Ceylon, in the vicinity of both the Great and Little Basses. It has also been proposed to place a lighthouse on the Pedra Branca, or White Rock, lying nearly in the centre of the eastern entrance to the Straits of Singapore. This, I believe, is intended to be erected as a monument to the memory of Horsburgh; and should the plan meet with encouragement, subscriptions will, I understand, be solicited from the mariners of all nations; but as to the steps that have been taken to carry out the above-mentioned plans I can give no information.

On every occasion when any change is made in any of the lights in use, the erection of new lighthouses, placing or removal of any lights, buoys, beacons, or other land and sea marks, due and prompt notice is invariably given to the local governments under which any of the above-mentioned measures take place, for the guidance and safety of those navigating the Eastern Seas.

SURVEYS Executed or in Progress during each Year:

First, those to the Eastward of Cape Comorin, made by the orders of the Supreme Government, Bengal.

1820. The marine surveyor-general had, I believe, two vessels attached to his establishment this year, but from the absence of any documents relative to the surveys executed by the above-mentioned department, I am unable to state to what extent they were carried on. The vessels, I believe, were principally employed in surveying in the vicinity of the Sandheads, Bay of Bengal, and the approaches to the Hooghly River, as well as on other detached surveys, of which, as before mentioned, I have no information available. One vessel was employed on the east coast of the Malay Peninsula for a short period.

1821. The vessels under the orders of the marine surveyor-general employed in search of the Bale of Cotton Rock, and also the London Banks, and on the coast of Coromandel, from the Pulicat Shoal to Armegon Hill.

1822. One vessel employed in surveying the Armegon Shoal and Blackwood's Harbour, on the Coromandel coast. As to the other surveys undertaken this year I am not able to give any account, but I understand that the vessels belonging to the surveying department, under the orders of the marine surveyor-general, were either sold or laid up at the end of the year.

1823. In January, Captain Daniel Ross, I. N., took charge of the office of marine surveyor-general, being appointed to that situation by the Honourable the Court of Directors of the East India Company, in consequence of the death of Captain Charles Court, I. N., the officer holding that berth. In April the "Investigator," a ship of about 450 tons, was purchased by the Supreme Government, and attached to the survey department, as the principal surveying vessel; in September the "Research," a vessel of 300 tons, was purchased on the stocks, launched on the 6th of the same month, and placed under Captain

Ross's orders, as assistant surveying vessel. The "Investigator" was employed in carrying treasure to various ports from May until December, when she proceeded to Point de Galle, Island of Ceylon, at which place the "Research" had received orders to join her, which that vessel did on the 17th of January 1824, having been employed carrying troops and military stores until the middle of December 1823; consequently no surveys were executed by the surveying ships in 1823; but the "Prince of Wales," H. C. cruiser on the Penang station, in addition to her other duties (that of protecting the Straits trade against the Malay pirates), was employed in surveying part of the east coast of Sumatra, from Diamond Point to Po. Panjore, the passages from Tanjong Bon and Pulo Barrellah to the southern entrance of the Straits of Durian, which Straits were surveyed by the same vessel during the year 1822.

1824. In the month of March the surveying ships "Investigator" and "Research" commenced the survey of the Mergui Archipelago; the positions of several of the small islands lying south of the Island of St. Mathew were fixed, and a small part of the adjacent coast was examined; in April the ships were recalled by the Supreme Government; in June they arrived at Calcutta, when they were placed at the disposal of the Commander-in-Chief, India, the late Sir Edward Paget, for the purpose of being employed in the war then commenced against the Burmese.

The officers attached to the marine surveyor-general's department were employed, together with the surveying vessels, from June 1824 until November 1826, in the war against Ava, and latterly the vessels were employed as troop ships.

The only trigonometrical marine surveys executed during the years 1825 and 1826 were the surveys of the Chittagong, Rangoon, and Tavoy Rivers, with the "James and Mary Sands" in the River Hooghly; various other detached surveys of creeks, rivers, &c., at the seat of war were likewise made, but they were for the most part only compass ones, or eye sketches. In November 1826 the "Investigator" was returned to the surveying department, but the "Research," assistant vessel, being given over to Captain Dillon, for the purpose of being employed on a voyage in search of La Perouse, the "Trusty" ketch was substituted in her room.

1827. In the early part of this year, and I believe the latter part of 1826, Captain Crawford, I. N., with two officers of the same service, while attached to the flotilla on the coast of Arracan, surveyed in an hired brig the coast of Ava, from the Vestal's Shoal in $18^{\circ} 01'$ north (named by mistake in the chart, Williams' Shoal), to Porian Point in $15^{\circ} 48'$ north.

On the 19th of January the surveying vessels "Investigator" and "Trusty" arrived at Amherst (Martaban coast, Ava), and commenced surveying operations; on the 21st of February the "Trusty" was made over to Sir Archibald Campbell, commanding in chief in the British possessions in Ava, at his particular request; on the 17th of March the "Freak" joined in the "Trusty's" place, as assistant vessel. A survey was made of the Martaban River from Amherst, situated at its entrance, up to the town of Moulmein, together with the anchorage off the former place, after which, owing to the hazy and foggy weather that after the month of January usually prevails on the coast of Martaban and Tenasserim, the labours of the surveying vessels were principally confined to the making of such observations as would be useful on their return to the coast after the south-west monsoon. In the middle of April, having examined the coast partially as low down as Mergui and the Western Canister, the approach of the monsoon compelled the vessels to quit the coast for Penang, Prince of Wales's Island, where they received their necessary refits. The "Freak" had to be hauled on shore to repair her copper.

During the greater part of the monsoon the vessels were employed in surveying the new harbour of Singapore and the islands in its vicinity, and on the 1st of October they sailed from Penang to resume the survey of the Mergui Archipelago and Tenasserim coast, which was continued to the close of the year.

1828. During the month of January the vessels were employed in surveying part of the Martaban and Mergui coasts and adjacent islands; on the 3d of February they left the coast for Calcutta, at which place they arrived in the month of March. The "Investigator" was employed for a short period in carrying treasure, on her return from which service, being examined, she was found

found to be so much injured by white ants, as to be pronounced unseaworthy, and was ordered, after having been steamed, to be used as a hulk. The "Freak" was sold out of the Government service.

Lord William Bentinck, Governor-general, having ordered the surveying establishment to be broken up, the officers of the Indian navy attached to it, with the exception of the marine surveyor-general, and the draftsman to the survey, were ordered round to Bombay to rejoin their service. The latter end of this year, the marine surveyor-general proceeded in a pilot brig to survey and examine the various channels at the entrance of the River Hooghly.

1829. The first part of this year the survey of the channels leading into the River Hooghly was continued; in October, orders were issued that the marine surveys under the Supreme Government were to be resumed. Two brigs from the pilot service were placed under the command of the marine surveyor-general, and were employed during the remainder of the year on the survey of the Mergui Archipelago and Martaban and Tenasserim coasts, originally commenced in the early part of the year 1824.

1830. The survey of the Mergui Archipelago, with the adjacent coasts, was continued; the first part of the year two vessels were employed, but only one during the latter part.

1831. Two vessels were employed this year until 23d of March in the survey of the Mergui Archipelago; the survey of the Arracan and Chittagong coasts, with the adjacent islands, was commenced the latter part of the year.

1832. Two vessels were employed this year continuing the survey of the Arracan and Chittagong coasts.

1833. Continuation of the above survey, with the Islands of Ramree and Cheduba. The first part of the year two vessels were employed, but during the latter part, the Government not being able to spare any vessel from the pilot establishment, a small brig of about 120 tons burthen was hired for the purpose of being employed as a surveying vessel. In November, Captain Daniel Ross, I. N., resigned the situation of marine surveyor-general of India; Lieutenant R. Lloyd, I. N., was appointed, acting in his room.

1834. The hired brig was paid off in the latter part of February; one brig employed this year, assisted by two decked row-boats, from October to December.

Surveys—Continuation of the survey of the Arracan coast, with part of the inland navigation of that province. Commenced the survey of the River Hooghly and the Sandheads, Bay of Bengal, in the month of October.

1835. Surveys—River Hooghly, from Kedgerie up to Calcutta, completed; False Point and its vicinity, and a small portion of the Sandheads. One brig with decked boats, two in number, employed during this year, excepting in the south-west monsoon, when the surveying operations were suspended.

1836. Channels leading to the River Hooghly and Sandheads, with part of Saugor Island, and survey of the coast line of the Sunderbunds commenced.

One brig, one small schooner, with two row-boats, were, I believe, employed on the above surveys at various periods during the year.

1837. Two brigs, two small schooners, and two row-boats were employed at various periods during this year, on the continuation of the survey of the coast line of the Sunderbunds, Bengal, and the several islands and creeks forming the delta of the Ganges, together with the Sandheads.

1838. Two brigs, one small schooner, and two row-boats were employed this year, on the survey of the coast line of the Sunderbunds, and the various creeks and islands forming the delta of the Ganges, and on the survey of the coast line, rivers, and the inner islands adjacent, of a portion of the Mergui Province, coast of Tenasserim, between the latitudes of $9^{\circ} 50' N.$ and $12^{\circ} 40' N.$ This latter part of the surveys executed during 1838 was made in the south-west monsoon, under very unfavourable circumstances.

1839. I have no information as to the number of vessels employed this year, but I believe there was no alteration made in the establishment. The survey of

the coast line of the Sunderbunds, with its creeks and islands, and the shoals off them, was continued.

1840. The survey of the coast line of the Sunderbunds, Bengal, from Saugor Island entrance to the River Hooghly to Chittagong, together with the creeks and islands forming the delta of the Ganges, with the shoals off them, carrying the soundings as far as latitude $20^{\circ} 58'$ north, was completed. Of the number of vessels employed I have no account.

1841 to 1848. Several detached surveys have been carried on during the above years, but I have no documents regarding them, or of the number of vessels employed; but the following I believe have been executed by Lieutenant Fell, I. N., under the orders of the Bengal Government: The coast line between the Moulmein and Sitang Rivers; a re-survey of the former river; the Santipilly Rocks and Mootapilly Shoals, on the Coromandel coast, with a portion of that coast, and a part of the coast line between Cape Negrais and the Sitang River; the remainder I understand is to be completed this year, 1849; the coast of Tinnevely from Cape Comorin to Tuticorin. This last survey was made by Mr. Franklin, an officer employed under the orders of the Madras Government, not belonging to the Indian navy. In the skeleton map forwarded with this report this portion is shaded of a light green.

SURVEYS under the Orders of the Bombay Government:

1820. The Government having ordered the Persian Gulf, its coasts, islands, &c., to be surveyed, the "Discovery," a ship of about 289 tons burthen, was commissioned for that purpose, and the survey was commenced from Cape Muscaldom; Muscat being considered a well fixed position, was the starting point of the gulf survey, the difference of longitude between it and Bombay flagstaff, then considered to be situated in $72^{\circ} 57' 40''$ east, having been most carefully measured.

The memoirs of the gulf survey available to me giving no dates, or mentioning the extent of coast line, &c., surveyed each year, renders it impossible for me to state its progress year by year as I could have wished.

1821. Continuation of the Persian Gulf survey; a partial survey was likewise made of the Gulf of Cutch by Lieutenant Middleton, I. N., in the "Sylph," whilst cruising there for the protection of the trade against the Guzerat pirates, extending on the northern side of the gulf, from Asseir Pagoda to Toona Creek, and from Jigat or Dwarka on the Cattiwar coast, to Jooria, on the southern side of the gulf.

1822. Continuation of the Persian Gulf survey; harbours of Rajapore or Toolsunda, Viziadroog or Geriah, and Dewghurr, with the adjacent coast, and the Bhowlearee and Soonderye Creeks, Gulf of Cambay.

1823. Continuation of the Persian Gulf survey; coast of the Southern Konkun from Bancoot River to Boria Pagoda.

1824. Surveying vessels employed on the survey of the Persian Gulf, principally on the Arabian side.

1825. Continuation of the Persian Gulf survey; the Arabian side of the gulf was completed, and in addition to the chart of the coast surveyed this year, separate plans on a large scale were completed of the Island and Harbour of Bahrein, anchorage off El Katiff, and the Harbour of Grane or Quade.

1826. Surveying vessels in the Gulf of Persia employed in surveying the northern part of the gulf and the coast of Persia from Ras Tuloop to Bushire; harbour of Angenweel, coast of Southern Konkun.

1827. Surveys this year—In the Persian Gulf, the entrances to the rivers at the head of the gulf, with part of the coast of Persia and adjacent islands; coast of the Southern Konkun, from Boria Pagoda to the entrance of Rajaporee River, with the Bancoot River; and surveys of the entrance to the rivers of Nagotna, Penn, and Apta, in the Harbour of Bombay.

1828. Surveys—The survey of the Persian Gulf; coast from Bushire to Basadore, with the whole of the islands and shoals off it, together with the islands of Kishm, Ormuz and Larrack, completing the Persian Gulf; the coast of Arabia,

Arabia, from Ras Goberindee to Muscat; the coast of the Southern Konkun, from Bombay to Bancoot, with the Panwell River, and a survey of the Laccadive Islands.

1829. Surveys—Coast of Persia and Scinde, from Kooe Mubarrack to Kurrachee; the survey of the Red Sea commenced; Northern Konkun; Bombay Harbour.

1830. Continuation of the survey of the Red Sea.

1831. Surveying vessels employed on the survey of the Red Sea.

1832. Continuation of the Red Sea survey.

1833. Continuation of the Red Sea survey; coast of Kattiwar, from Dio or Diu to Jigat or Dwarka; entrance to the Gulf of Cutch, with the Island and Harbour of Bate. The survey of the S. E. coast of Arabia was commenced the latter part of this year.

1834. The survey of the Red Sea, including the Gulfs of Suez and Akabah, was completed this year; the survey of the Maldiva Islands was commenced, as also the survey of the Gulf of Cambay, the survey of the S. E. coast of Arabia from Cape Babelmandel continued, and a survey completed of the Island of Socotra, and the small islands called the Brothers, in its vicinity.

1835. Continuation of the surveys of the Maldiva Islands and S. E. coast of Arabia; survey of the Gulf of Cambay completed; survey of the Kattiwar coast from Goapnauth Pagoda to Diu Head commenced; and the River Indus from Hyderabad to the sea was examined, and a survey made of Cochin Harbour and Roads.

1836. Surveys—Cape Aden, with the several bays in its vicinity, and a portion of the S. E. coast of Arabia surveyed; the Maldiva Islands and the coast of Kattiwar, from Goapnauth Pagoda to Diu Head, completed; examination of the River Indus continued.

1837. Korla Moorla Islands and Bay on the S. E. coast of Arabia surveyed, with a portion of the coast; this survey, commenced in the latter part of 1833, was discontinued in May this year (1837); during the progress of the survey, Captain Haines, of the Indian navy, by whom it was executed, was employed with the vessel under his command for various periods, amounting in all to about thirteen months, on other duties unconnected with his surveying ones; the Chagos Archipelago, and a partial survey of the Saya de Malha Bank; the Malacca Banks, entrance of the Gulf of Cambay, and the coast of the Northern Konkun from Dunnoo to Arnol Island; the harbour of Kurrachee; the Kedywaree, a branch of the Indus; portions of the Indus River, with the Hujamree mouth of the same. In November the survey of the coast of Madura, in the Gulf of Manaar, was commenced. This last survey was at the request, and was carried on under the orders of the Madras Government, the officers and vessels of the Indian navy employed on it being lent for that purpose by the Bombay Government.

1838. Surveys—Coast of Scinde, Kurrachee and Soonmianee Bays; the mouths of the Indus; the Indus River from Mittun Kote to Attock; eastern coast of Africa completed from Ras Hafoon up to Ras Jerdafoon (Cape Guardafui), and from thence to the westward as far as Ras Gulwainee, a distance of about 350 miles; part of the coast of Madura; the western side of Palk's Straits, Ramisseram Island, Adam's Bridge, and the Paumben Pass.

1839. The surveying vessels were employed the first part of this year in surveying the coasts of the Island of Ceylon, which was completed from Colombo to Point de Galle; it was intended that the whole of the coasts of the island, together with the Basses, should be surveyed; but in April, the services of the officers employed being otherwise required, the vessels were recalled, and on their arrival in Bombay were paid off; and from this period until February 1844 no ships were commissioned for surveying purposes, or so employed, with the exception of the "Euphrates" gun brig and "Shannon" schooner for a short period in 1841 and 1842, as before mentioned at page 118 of this Report.

The survey of the Euphrates, Tigris, and Kuran or Karan Rivers, with part of the countries in their vicinity, was executed by the officers of the Indian navy serving in the Euphrates flotilla between the early part of the year 1837 and June 1842; the results of which survey have been forwarded home to the East India House.

In 1841 the "Euphrates," Honourable Company's cruiser, while employed on the Berbera coast, eastern coast of Africa, surveyed the coast from Jibul Jarne to Sayara, including Tedjura Bay, and the Mushah and other islands adjacent to the coast.

In 1842, the "Shannon" schooner was employed in surveying the harbour of Soonmianee for a short period in January and February.

In the notice of the surveys carried on in the year 1839, I find that I have omitted to mention that the mouths of the Indus were re-surveyed, and in that of 1825, that the "Discovery," principal surveying vessel, was taken from the Persian Gulf survey in May, and did not return to it until the beginning of March 1826, having been employed on duties unconnected with the survey, round to the eastward.

1844. Two brigs and a cutter were commissioned this year as surveying vessels; one brig was employed on the coast of the Southern Konkan, and one brig and the cutter on the S. E. coast of Arabia, which survey, discontinued in May 1837, was resumed, recommencing it at Morbut, the bay of which place was surveyed and the coast for about four miles and a half to the eastward of it, after which the vessels proceeded to the westward.—Coast of Southern Konkan surveys: Rutnagheriah Roadstead, the harbours of Dhewghur, Viziadroog, and Rajpore, with the Rajpore River up to the town of the same name, and the coast from Dewghur to Malwan. The latter part of the year the vessel employed on this survey was engaged principally in the operations against the Sawunt Warree insurgents.

1845. Surveys—Continuation of the survey of the S. E. coast of Arabia, from Ras Morbat to Ras Seger, and between Ras Fartak and Messinah; Southern Konkan; Kariputtun or Viziadroog and Tiracole Rivers; Algoada Roads; coast from Malwan to Algoada, with the Burnt Islands or Vingorla Rocks. In the first part of this year the vessel employed on the coast of the Southern Konkan was principally engaged in carrying troops, prisoners, &c. and in other duties connected with the operations against the Sawunt Warree insurgents.

The same number of vessels employed this year as in the preceding one; the surveys were not carried on during the S. W. monsoon.

1846. The first part of the year the same number of vessels were employed, but in the latter part a small cutter was added to the surveying establishments.

Surveys—S. E. coast of Arabia, about 300 miles completed, with the Island of Maseira. On the coasts of Canara and Malabar, Carwar or Sudashaghur Bay and River; the anchorages off Merjee, with part of the River Onore, and Mangalore, with the coast line from Mount Delly to the Beypoor River; Anjadeeva Island and adjacent coast, with the entrances to the principal rivers from Algoada to the Beypoor River.—Surveys on the coast of Scinde: Kurrachee Harbour re-surveyed to ascertain if any changes had taken place since its survey by Captain Carless, with a portion of the coast line off the mouths of the Indus.

The surveying operations, as in the preceding years, were suspended during the S. W. monsoon.

1847. Two brigs and two cutters employed this year, excepting during the strength of the S. W. monsoon.

Surveys—On the eastern coast of Africa, about 200 miles of coast line, connecting the surveys of Captain Carless and Lieutenant Barker, from Berbera to Ras Gulwainee or Gulwait; on the N. E. coast of Arabia, the soundings in the Gulf of Maseira were completed, with about 360 miles of coast, comprising in the whole of the above surveys on the coasts of Africa and Arabia executed this year by Lieutenant Greive, about 3,500 square miles of close soundings.

On the coast of Scinde, the survey of the bank off the mouths of the Indus was completed, with a portion of the coast line from the Hujamree mouth of the Indus

Indus River to latitude $23^{\circ} 50' 30''$ N., and longitude $67^{\circ} 56' 30''$ E., with Mandavie Roadstead, and the shoals off it; also a survey of Angria's Bank was completed.

The late Lieutenant Christopher, Indian na vywho was killed at the siege of Mooltan, made a survey of the Chenab or Acesines River, from the hills to its confluence with the Sutlej, including an examination of the mouths of its tributaries, the Jhelum or Hydaspes, and the Ravee or Hydrastes.

1848. One brig and one cutter employed examining the shoals and islands off Socotra, and in making a careful examination of the bank to the northward of that island, reported by the commander of the Honourable Company's steam frigate "Semiramis," and named by him Sir Robert Oliver's Bank. This survey, which was completed by the 20th of May, comprised about 70 miles of coast, and 4,000 square miles were sounded over.

One brig and one cutter employed in surveying the islands and reefs at the northern part of the Laccadive Group, with the Padua and Sesostris Banks, which latter bank was discovered by the late Captain Carless, in the Honourable Company's steam frigate "Sesostris," on her return from Aden to Cananore with troops in April 1847. This survey was finished in May, when the whole of the surveying vessels returned to Bombay for the S. W. monsoon, and to refit, after which they resumed their surveying duties; one brig, the "Taptee," with her tender, the "Maldiva," being employed in surveying the various banks off Bombay. The limits of the ground to be sounded over and examined north and south was that comprised between the extreme northern edge of Angria's Bank up to the southern edge of the Malacca Banks, and east and west from the longitude of Bombay lighthouse, in $72^{\circ} 48' 56''$ east, out to $70^{\circ} 30'$ east. The object of this survey is to furnish ships, as far as possible, with a correct guide for approaching and making the harbour of Bombay, particularly during the thick and unsettled weather that prevails during the S. W. monsoon. This survey is not yet completed (July 1849).

The "Palinurus," with her tender, the "Nerbudda," was employed the latter part of the year on the coast of Scinde, completing the parts of the coast line left unsurveyed; the creek and anchorage off Porebunder, Kattiwar coast, was surveyed at the commencement of her operations in October.

1849. This year, in the fair season, from January to May, the "Taptee," with her tender, was employed surveying in the vicinity of Bombay, as before mentioned.

The "Palinurus" and tender, employed in January and February on the coast of Scinde, from the month of March until the 16th of April in search of the Challenger Bank, and on the Arabian coast from Ras-el-Had to Muscat, completing the survey of the S. E. coast of Arabia, after which, the "Palinurus," accompanied by her tender, proceeded to Cape Jask on the Persian coast, and closely sounded the coast from that point to Ras-el-Khore, in search of the shoal reported by Lieutenant, now Commander F. Jones, I. N.

The surveying vessels are now awaiting the close of the S. W. monsoon to resume their operations.

The survey of the tidal channels lying between Point Munora, Kurrachee Harbour, and the Keddewarry mouth of the Indus, commenced in 1848, were completed in the month of January this year by Mr. Acting Master Fenner.

The sailing directions published by order of the Honourable the Court of Directors of the East India Company since 1820, in a separate form, are as follows; viz., "Sailing Directions for the Maldiva Islands and the Chagos Archipelago, by Commander Moeresby, I. N., in 1840;" and "Sailing Directions for the Red Sea, by Commanders Moeresby and Elwon, I. N., in 1841," to accompany the charts of the surveys of those localities. The latter work has been transferred by permission to the fifth and last edition of Horsburgh's East India Directory, published in 1841, which invaluable work being compiled and published by the hydrographer to the East India Company, under their patronage, and the results of the various surveys by their officers in the eastern seas, with other information relative to their navigation from the records in the East India House being incorporated in it, it may be considered in the light of an official work, and renders it the less necessary for the East India Company to publish the sailing directions relative to the coasts of India, up to 1841 in a separate form, as no ship properly found ever comes out to India unfurnished with Horsburgh. Every

vessel belonging to the Indian navy is provided with a copy by the Government, the Court of Directors sending out an ample supply for that purpose; and of the sailing directions before mentioned, there is a sufficiency in the Indian Navy Draftsman's Office fully to meet all demands of the Government or of other parties, but there has been but few applications for them, only two copies having been sold to the commanders of merchant vessels, and a few others to officers of the Indian navy.

In the Journals of the Royal Geographical Society will be found a number of valuable papers, given by the Court of Directors of the East India Company, relative to the navigation of the coasts of Arabia, the Rivers Indus, Euphrates, Tigris, &c. by Captains Haines, Carless, Sanders, and Lynch, and Commander F. Jones, of the Indian navy.

The Journals of the Bombay Geographical and Bengal Asiatic Societies likewise contain a great number of valuable memoirs connected with the surveys of the coasts of India and their inland navigation, by the officers of the Indian navy and others, fully attesting the anxiety of the local governments to disseminate every information, as far as lays in their power, tending to the safety of those navigating the eastern seas.

The results of the various surveys undertaken since the latest edition of Horsburgh was published in 1841, when completed, will doubtless be printed either as a supplement to it, or in a separate form, as the Court of Directors may deem most eligible for the interests of navigation.

There are no agents in India appointed by the East India Company for the sale of the charts published by or under their direction; in England, the agents are Messrs. Wm. H. Allen & Co., 7, Leadenhall-street, London. With reference as to what supply of charts is kept in India, as far as regards the Presidencies of Bengal and Madras I can give no information, but the Bombay Government are always furnished with copies of every chart published by the Hydrographical Office at the India House, generally 50 of each chart; any further supply, or any charts not published by the East India Company that may be required, are always forwarded on an application being made to the Court of Directors for them. The number of charts at present (August 1849) in the Indian Navy Draftsman's Office amounts to about 8,000, comprising about 840 different localities, principally in the eastern seas; these are for the use of the vessels of the Indian navy or Her Majesty's service when required, and the officer in charge of them has been directed on every occasion, when private persons have made applications for charts, to supply them whenever they could be spared; and in all cases when they could not, copies have been allowed to be taken of any particular chart required, with the exception of those in manuscript not published, and every information regarding the navigation of the eastern seas available in the Indian Navy Draftsman's Office has been given to any one applying for it. It may perhaps in connexion with the above not be improper in this place to mention, that owing to the liberality of Government, all commanders of merchant ships are allowed, on application, to lodge their chronometers in the observatory at Bombay, for the purpose of having them rated, free of expense; likewise on various occasions they have been assisted in the examination and testing of their compasses; the time is shown at the Observatory every day at 1 A. M. (mean time), and the time of evening gun-fire is taken, and published every day in the newspapers, and memorandums of the same are sent to the Master-attendant's Office and Chamber of Commerce, for the use of the shipping, and every information and assistance in the power of the Observatory is given.

The surveys required to be done in order to complete the coasts of India and the eastern seas, for the purpose of ensuring correct charts and sailing directions for their navigation, are as follows, commencing with the coast lines to the westward of Cape Comorin:

The East Coast of Africa.—The vessels of the Indian navy seldom proceed further to the southward on this coast than Zanzibar; but on the chart of the east coast of Africa, including the Island of Madagascar, sheet 4, by Captain Owen, R. N., and the officers of H. M. ships "Baracouta" and "Leven," there is a blank space of about 30 miles in extent to the southward of Monfera Island, which

which requires to be filled in, and it would be advisable that the coast line from Cape Delgado to Ras Hafoon, the point where the late Captain Carless, I. N., commenced his survey of the north-east coast of Africa, be carefully examined, of course omitting those portions already minutely surveyed by Captain Owen and his assistants. Several rivers having navigable openings to seaward are reported to exist along this coast, and are so marked in the old Portuguese maps. The Jubb or Govind River, according to the late Lieutenant Christopher, I. N., in his account of his visit to the east coast of Africa in the Honourable Company's gun-brig "Euphrates," published in the 14th volume of the Journal of the Royal Geographical Society, is open to British enterprise; the friendly chiefs of Bravah invited him to enter the river, offering every assistance. The Haines' River also, mentioned by the same officer, in the same paper, should, if possible, be examined as to whether it has an opening to seaward fit for the purposes of navigation. One great obstacle to all attempts to penetrate into the interior of Africa on this coast is the deadly nature of the climate to European constitutions, but I believe from Mombas to the northward it is considered healthy. As will be seen in the skeleton map accompanying this Report, the whole coast line from Ras Hafoon, including the Red Sea and Persian Gulf, until we reach the Gulf of Cutch, has been or will be completed this year; the part from Ras-el-Had to Muscat being already finished, and the small portion of the coast of Scind left unsurveyed, will be examined in the course of the next month (September.)

The Gulf of Cutch will require to be carefully surveyed, as there are no correct charts or maps embracing the whole gulf in existence, the only two published being partial surveys, principally about the entrance.

The surveying vessels employed completing the coast of Scind have been ordered to carry out lines of soundings along the Kattiwar coast, further out to seaward than was done in the survey of that coast by the late Lieutenant White-locke, I. N., as several shoal spots are said to exist in the line from Dwarka to Diu-head not noticed in the charts. The next point that it will be necessary to examine, is the coast of the Northern Konkun, from the entrance of the Taptee or Surat River to Danoo, which will connect Commander Ethersey's survey of the Gulf of Cambay with that portion of the coast between Danoo and Arnol Island examined by him after completing the Malacca Banks, in 1837. From Arnol Island to Bombay will be the next portion of the coast line to be surveyed. The banks off Bombay, as already mentioned, are in the course of examination, and will be completed this year.

The coasts of Canara and Malabar will next require attention; the published charts are very incorrect as far as regards the coast line; the publication in 1827 and 1833 by the Honourable East India Company of that portion of the grand trigonometrical survey of India comprising the coast line from Cape Comorin to Goa, afforded an excellent opportunity for their correction, which has not been taken advantage of, as the errors still remain. The coast extending from Bombay to Goa has been surveyed, but no charts of it have as yet been published, with the exception of the Harbours of Bombay and Augenwell, as some portion of the work still remains to be transmitted to the Hydrographical Office of the East India Company in England. As will be seen by reference to the skeleton map accompanying this Report, some parts of the Malabar coast have been surveyed; those portions marked in yellow as partially surveyed, and from Calicut to Cape Comorin, will require to be filled in with soundings; the delineation of the coast line in the maps already published by the East India Company of the coast from Goa to Cape Comorin will much facilitate the work, the points fixed by the grand trigonometrical survey affording excellent bases of verification, and serving to connect the land and marine surveys of India together; it would likewise be most advisable that lines of soundings extending out to seaward as far as the banks and islands off the coast from Bombay to Cape Comorin, be taken, connecting the surveys of the different banks and the Laccadive and Maldive Islands with the coast; this would render the charts of this part of the eastern seas perfect.

ISLANDS and BANKS to the Westward of Cape Comorin:

The Chagos Archipelago.—Owen's Bank still remains unsurveyed, which requires to be done in order to complete the survey in this vicinity.

Saya de Malha Bank.—The southern part of this bank has been well sounded by Captain Moresby, I.N., and the survey of it completed as far as $9^{\circ} 30'$ south; from this point to the northern extremity, in about latitude $8^{\circ} 40'$, a space of about 90 miles requires to be surveyed; this to be properly done, according to Captain Moresby, would take a vessel about one month to complete.

Seychelle Islands.—A large extent of space, particularly on the north-western part of the bank off the islands, requires to be carefully explored; several shoal patches have been reported to exist on the outer edge, in the vicinity of Bird Island (to the westward of it). The vessel employed on this service, should likewise be directed to examine the positions assigned to the following vigias, marked in the chart of the Indian Ocean from the Cape of Good Hope to Calcutta, by Mr. Walker, the Geographer to the East India Company, published in 1842; viz., Swift's Bank, Rose Galley Rocks, the Bridgewater or Roquinez Rocks, and George Island, situated to the northward of the Saya de Malha Bank, in order to ascertain if they really exist.

SURVEYS required to the Eastward of Cape Comorin :

Island of Ceylon.—The only marine surveys completed of this island that I am aware of, are the coast from Colombo to Point de Galle, by Lieutenants Powell and Ethersey, I.N., and the harbour and bays of Trincomalee, by Lieutenants Cannon and H. Loring, R.N., and Penloos Bay and Batacalao Road, by Captain P. Heywood, R.N.; the remaining part, together with the Great and Little Basses, and the passages between them and Ceylon, will require to be carefully surveyed.

Bay of Bengal.—The coasts of Coromandel, Golconda, and Orixá, from Point Calymere to False Point, various portions of these coasts have been surveyed; the Coleroon Shoal, and from thence to Pondicherry has been, I understand, completed by the officers of the French Navy; the Pulicat and Armegon Shoals, with the adjacent coast and Mootapilly Bay, by Captains Court and Maxfield, I.N.; and Lieutenant Fell, of the same service, has been employed in surveying the Mootapilly Bank and the Santapilly Rocks, but much remains to be done. From not having the details of the surveys lately executed before me, I am unable to state what extent of the above coasts remains to be examined. In the chart of the Bay of Bengal, published by the hydrographer to the East India Company, corrected up to 1844, between Pondicherry and Madras there are three banks, two of them said to be discovered in 1820, marked doubtful; the easternmost one, off Covelong, thirty-seven miles off shore, has only five fathoms marked on it; these of course will require carefully examining. The coast line from False Point to Cape Negrais has been carefully and minutely surveyed, and the results of the various surveys published.

Andaman Islands.—I believe there has been no regular survey of these islands since that of Lieutenant Blair's in 1793; it is highly necessary that a re-examination of the whole group, as well as that of the Nicobar Islands, with the several channels and shoals off them, should be made, carrying the soundings up to Cape Negrais. The coast line from Cape Negrais to the Sitang River is, I believe, being surveyed, and will be completed this year. From the latter place down to latitude $8^{\circ} 40'$, the coasts of Martaban and Tenasserim, with the islands forming the Mergui Archipelago, have been carefully examined, and the charts of the surveys published. From $8^{\circ} 40'$ to the Island of Penang, including the Island of Salanga or Junkseylon, and the numerous small islands between the Seyer Islands and Penang, will require to be examined, as that line of coast has never been accurately surveyed. Prince of Wales' Island or Penang, with the passage between it and the main, was surveyed by Lieutenant T. Doore, R.N., in 1832.

Much requires to be done in order to complete the Straits of Malacca, particularly on the Sumatra side; that island, both on its eastern and western shores, with the group of islands off the western side, require to be accurately and carefully surveyed, as only portions of Sumatra have been properly examined, the greater part of what has been published regarding that island being only the results of compass surveys, eye sketches, and casual observations made from time to time by intelligent seamen. The coast of the Malay Peninsula, from
Point

Point Romania to Cape Patani, will next require the marine surveyor's attention. The coasts of the Gulf of Siam, both on the eastern and western side, from Cape Patani to Mui Sha Kaoe, the south-west point of the coast of Cambodia, bounding the Siamese Gulf on its eastern side, with the numerous islands in it, are very imperfectly known, and it is due to our increasing commerce that this locality should be accurately and carefully surveyed.

The delineation of the coast line of the Gulf of Siam, particularly that part on the Siam side contained between Tantalum (North Point) in latitude $8^{\circ} 25'$ to Cin Point in latitude 12° north, will be most interesting to geographers, as it will fix the exact breadth of the Isthmus of Kraw, and also be the means of ascertaining to what extent the rivers on either side approach each other, or if any communication by water exists between the coast of Tenasserim and the Gulf of Siam, as in some old maps that I have seen, some rivers are represented as intersecting the whole breadth of the Isthmus. The coal-fields discovered by the late Dr. Helfer are situated in about latitude $11^{\circ} 58'$ north, and in longitude $99^{\circ} 30'$ east, which makes the site of them, according to the charts, distant in a direct line from Cin Point, about 34 miles, and from the town of Cin, situated in a more southerly direction, only 23 miles. Captain Lloyd, I. N., remarks in his paper published in the seventh volume of the *Journal of the Asiatic Society, Bengal*, intitled, "A Short Notice of the Coast Line, Rivers, &c., forming a portion of the Mergui Province, from a late Survey," that he has doubts whether the coal-fields in question are in the British or Siamese territories; an important point which it is very necessary should be adjusted, in order to prevent any disputes as to the right of possession, and which would be settled by the survey I have indicated.

The China Seas and its coasts, the southern and eastern passages into them, present a vast field, requiring to be thoroughly explored, and it will require infinite labour, much time and skill to combine with each other the various surveys, executed by the scientific officers of almost all the European Navies. Her Majesty's vessels are now actively engaged in the China Seas, and I believe several excellent surveys of their possessions in the East have been lately made by the officers of the Dutch Navy, some of which are published. The Islands and surrounding shores of the Arafura Sea, the coasts of New Zealand, and New Guinea, and the approaches to Torres Straits, all require to be well examined, in order to render the navigation of them secure.

Not having the whole of the Admiralty surveys of the China Seas lately executed by the officers of the Royal Navy available to me, or those made by the officers of the Foreign Navies, I cannot pretend to state what actually requires to be done in those localities.

With regard to the question as to the measures that have been adopted to render the great trigonometrical survey of India available for the purpose of establishing points on the coasts of India, the publication by the East India Company from time to time of the various maps and works connected with it, as also the plan of the trigonometrical operations carried on in the Peninsula of India, from 1802 to 1814, inclusive, by Colonel Lambton and his assistants, published by their sanction, and by their hydrographer, will be, I consider, a sufficient answer; but no simultaneous operations have ever been carried on by the officers of the land and marine surveys: Captain R. Lloyd, I. N., in his survey of the River Hooghly, connected his survey of it with the south end of the Great Base on the Barrackpore road, and carried a set of triangulations from it down to the southern point of Saugor Island and Hedgelee Pagoda, places situated respectively on the eastern and western shores of the Hooghly.

Before quitting the subject of Indian surveys, I would venture to suggest that it would be highly advantageous that the difference of longitude be measured between Alexandria (the Pharos) as fixed by Captain W. H. Smyth, R. N., &c., in his beautiful survey of the Mediterranean and Suez, the positions assigned to which latter place by Colonel De Haviland, Madras Engineers, Captain Moresby, I. N., Professor Rüppell, and in the "*Connaissance des Temps*," do not agree; and from Suez, a series of carefully conducted chronometric measurements should be brought down to Aden, and from thence to Bombay, serving to connect the

surveys of the Red Sea, &c., with the Mediterranean, as has been done with the Persian Gulf survey by the officers of the Euphrates flotilla.

The subject of ascertaining the difference of longitudes between Alexandria and Bombay has, I believe, been already brought to the notice of Government by Captain Haines, of the Indian Navy, with reference to the position assigned to Bombay.

The total number of charts engraved and published since 1820, up to the present time, by and under the authority of the Honourable the Court of Directors of the East India Company, and sold by their booksellers, Messrs. W. H. Allen & Company, Leadenhall-street, London, amounts to 145 in number, as follows, viz.:—

	Sheets.
Coast of Africa - - - - -	4
Red Sea - - - - -	7
S. E. Coast of Arabia and Islands - - - - -	4
Persian Gulf and Arabian Coast - - - - -	21
Coast of Sind, Gulf of Cutch, and Cambay, &c. - - - - -	26
Bay of Bengal, &c. - - - - -	27
Martaban and Tenasserim Coasts - - - - -	13
Straits of Malacca, China Seas, &c. - - - - -	38
Indian Ocean - - - - -	5
TOTAL Number - - - - -	145

The largest size engraved is antiquarian, and the prices vary from 10 s. 6 d., to 1 s. each sheet. The demand for charts here (Bombay) is very limited, what it is at the other Presidencies I am unable to say; the reason I suppose is, that most ships coming out to India from England are already provided with every chart they may require. Up to the present time (August 1849) the greatest number of charts supplied to private parties, was last year, 1848, of the value of seventy-eight rupees, six annas, and three pice (Rs. 78, 6 annas, 3 pice). The sums realized by the sale of charts is paid into the Government treasury.

With regard to the list required of the charts, their description, prices, &c., &c., published by and under the authority of the East India Company since 1820, the period embraced by the Parliamentary inquiry, the catalogue accompanying this Report will, I trust, afford every information required.

I have, &c.

(signed) *Chas. W. Montriou*, Commander, I. N.,
Draftsman, Indian Navy,
In charge of Observatory.

Indian Navy Draftsman's Office,
27 August 1849.

APPENDIX TO REPORT.

DESCRIPTION, Dates of Execution, and Publication of the CHARTS and SAILING DIRECTIONS, with the Scale of the CHARTS, and their Size, published by the Authority of the Honourable East India Company, from 1820 to 1849, inclusive.

Five per cent. is charged on the price of the Charts sold to private persons. The prices annexed to the Charts does not include mounting.

Sheets : Number.	Names of Charts.	Author.	Size of Sheet and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	REMARKS.
	COAST OF AFRICA :		<i>In. tenths.</i>			<i>£. s. d.</i>	The following are the abbreviations used in this list :—
2	N. E. Coast of Africa, from Ras Gulwainee to Ras Hafoon.	-- Lieutenant T. G. Carless, I. N., assisted by Lieutenants Jardine, Sheperd and Greive, and Messrs. Ball, Whitburn, Selby and Scott, Midshipmen, I. N.	d. = 15 0 Imp.	15 August 1848	1838	- 5 -	Showing the Size. Demy - - D. Medium - - M. Royal - - R. Super Royal - - S. R. Imperial - - Imp. Elephant - - E. Colombier - - C. Atlas - - A. Double Elephant D. E. Antiquarian - Ant. Emperor - - Emp.
2	African Coast from Sibal Jarne to Sayara.	-- Lieutenants Barker and Christopher, I. N.	d. = 15 0 Imp.	15 May - 1844	1841	- 5 -	
	RED SEA :						Showing the Scale. d. Degree of latitude. m. Geographic mile.
2	Northern part of the Red Sea.	-- Commander R. Moresby and Lieut. T. G. Carless, I. N.	d. = 6 0 D. E.	1 August 1836	1834 and 1835	- 12 -	
2	Southern part of the Red Sea.	-- Commanders Elwon and Moresby, and Lieutenants Pinching and Carless, I. N.	The same. D. E.				
1	Survey of the principal Harbours and Anchorages in the Red Sea, south of Jiddah.	-- Commanders Elwon, S. B. Haines, and Lieutenant Pinching.	-- Plans of harbours, various scales. M.	14 February 1843	1829 and 1837	- 3 -	The figures denote inches and tenths of an inch. Thus :—D. E. d = 1 5 implies that the chart is printed on a sheet of double elephant, and that its scale is one inch and a half to the degree of latitude.
1	Principal Harbours and Anchorages in the Red Sea, north of Jiddah.	-- Commander Moresby, and Messrs. F. Jones, I. N., Greive and Ford, Midshipmen, I. N.	The same. A.	8 February 1843	not stated	- 2 -	The size of the sheet when not measuring the exact dimensions of any of the above, is given to the one it approaches nearest to.
1	Arabian Sea, extending from 10° south latitude to Suez, and from 39° to 63° east longitude.	-- Captain James Horsburgh.	d. = 1 0 C.	1 February 1816, with additions up to 1846.	- - -	- 7 6	Second edition.
	S. E. COAST OF ARABIA AND ISLANDS :						
1	Island of Socotra	-- Commander S. B. Haines, Lieutenants Welsted, Sanders, and Messrs. Rennie, Cruttenden and Fleming, Midshipmen, I. N.	m. = 0 5 C.	1 August 1835	not stated	- 3 -	
1	S. E. Coast of Arabia, from the Straits of Babelmandel to Inisenaat, with several Plans.	-- Commander S. B. Haines, assisted by Lieutenants Welsted, Sanders, Jardine and Sheperd, Messrs. Ball, Stephens, Rennie, Cruttenden, Green and Barrow, Midshipmen.	d. = 6 0 plans of various scales. Ant.	16 Sept. - 1839	1836	- 4 6	
1	The several Bays near Cape Aden.	-- Commander S. B. Haines, and assistants.	m. = 1 0 C.	15 August 1839	1836	- 3 -	
1	Kooria Moorla Bay, and Islands.	The same - -	m. = 0 5 C.	14 May - 1840	1837	- 3 -	
	PERSIAN GULF AND COAST OF ARABIA :						
1	Survey of the Harbours of Matra and Mucsat.	-- Lieutenants G. B. Brucks and S. B. Haines.	m. = 8 0 Imp.	1 July - 1831	1828	- 2 -	

Sheets: Number.	Names of Charts.	Author.	Size of Sheet, and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	Remarks.
PERSIAN GULF AND COAST OF ARABIA— <i>contd.</i>			<i>In. tenths.</i>			<i>£. s. d.</i>	
1	Battnah and Burka Coast -	- - Commander G. B. Brucks and Lieutenant S. B. Haines.	d. = 12 0 S. R.	July - - 1831	1828	- 2 -	
1	Entrance to Gulf of Persia and Coast of Arabia, from Ras Goberindee to Muscat.	The same - - -	d. = 12 0 S. R.	1 June - 1831	1828	- 2 6	
1	Coast of Arabia from Ras Goberindee to Ras Soaote.	The same - - -	m. = 2 0 A ^s .	1 June - 1832	1828	- 3 -	
	Gulf of Persia, constructed from the trigonometrical surveys made by orders of the Honourable the Court of Directors.	Commander G. B. Brucks	d. = 4 0 E.	1 January - 1832	1830	- 4 -	
5	Persian Gulf, Arabian side, extending from Cape Moosendom to the Euphrates.	-- Lieutenants J. M. Guy, G. B. Brucks, W. E. Rogers, and R. Cogan, I. N.	d. = 12 0 2, 1st sheets, E. 3, or ditto, C.	<i>Sheets.</i> 1st, 15 April 1826 2d, 1 Sept. 1826 3d, 8 July 1826 4th, 1 Jan. 1829 5th, 1 Sept. 1828		1822 to 1825	{ 3s. each. - 15 -
1	Island and Harbour of Bohrein, Arabian side of Persian Gulf.	- - Lieutenants G. B. Brucks and W. E. Rogers.	m. = 0 5 R.	16 June - 1828	1825	- 2 6	
1	Anchorage off El Katiff -	The same - - -	m. = 0 5 $\frac{3}{4}$ D.	1 March - 1828	1825	- 2 -	
1	The Harbour of Grave or Quade.	-- Lieutenants J. M. Guy and G. B. Brucks.	m. = 0 5 D.	1 January - 1828	1825	- 2 -	
1	Entrances to the Rivers at the head of the Persian Gulf.	- - Lieutenants G. B. Brucks and S. B. Haines.	m. = 1 0 A ^s .	2 May - 1831	1827	- 3 -	
1	Coast of Persia from Ras Tuloop to Bushire.	- - Lieutenants G. B. Brucks and R. Cogan.	d. = 12 0 R.	1 April - 1828	1826	- 2 6	
1	Bushire Roads - - -	The same - - -	m. = 2 0 R.	1 February - 1828	1826	- 2 -	
1	Coast of Persia from Bushire to Bassadore.	- - Lieutenants G. B. Brucks and S. B. Haines.	d. = 12 0 C.	1 May - 1831	1828	- 3 -	
2	Clarence's Straits, Persian Gulf.	- - Commander G. B. Brucks and Lieutenant S. B. Haines.	m. = 1 0 1st sheet, C. 2d sheet, S. R.	<i>Sheet.</i> 1st, Nov. - 1831 2d, 1 Sept. 1831		1828	- 5 -
1	Coast of Persia and Beloochistan, from Kooe Mubarrack to Kurrachee, with four Plans of Bays on same sheet.	The same - - -	d. = 4 0 plans on various scales. D. E.	1 August - 1832	1829	- 3 -	
COAST OF SCINDE, KATTIWAR, GULFS OF CUTCH AND CAMBAY, &c. :							
1	Soonmianee Harbour - -	- - Lieutenants C. W. Montriou, assisted by Lieutenant Trushard, Messrs. Fergusson and Holt, Midshipmen, and Lieutenant Robertson, 25th Reg. N.I.	1,000 yds. = 1 0 D.	14 June - 1843	1842	- 1 6	
1	Kurrachee Harbour - -	- - Lieutenant T. G. Carless, assisted by Lieutenants Sheperd and Greive, and Messrs. Ball, Whitburn, Selby and Scott, Midshipmen.	m. = 4 0 Imp.	25 May - 1844	1838	- 2 -	
1	Entrance to the Gulf of Cutch, with the Island and Harbour of Bate.	- - J. T. Jones, Midshipman, I. N.	d. = 20 0 $\frac{3}{4}$ D.	1 September 1834	1833	- 1 -	
1	Gulf of Cutch - - -	Lieutenant Middleton, I. N.	m. = 0 4 C.	1 July - 1823	1821	- 3 -	
1	Coast of Kattiwar from Dio to Dwarka.	- - Lieutenant H. R. Whitelocke, I. N.	d. = 20 0 S. R.	1 January - 1835	1833	- 2 6	
2	Kattiwar Coast from Diu Head to Perim Island -	- - Lieutenant R. Ethersey, I. N., assisted by S. H. Buckler.	d. = 36 0 R.	3 March - 1845	1836	- 4 -	
1	Dio Harbour - - -	- - Lieutenant H. R. Whitelocke, assisted by Messrs. Hawes and Garrett.	m. = 4 5 D.	1 November 1834	1833	- 1 -	
1	Gulf of Cambay - - -	- - Lieutenant R. Ethersey, assisted by Messrs. Fell, Whitburn and Campbell, Midshipmen.	d. = 29 0 C.	1 January - 1845	not stated	- 3 -	
1	Malacca Banks - - -	- - Lieutenant R. Ethersey, assisted by Mr. W. E. Campbell, Midshipman.	d. = 25 0 Imp.	3 March - 1845	1837	- 1 6	
2	Bombay Harbour - - -	- - Lieutenant R. Cogan and Mr. G. Peters, Midshipman.	m. = 2 0 R.	1 May - 1833	1829	- 4 -	

Sheets: Number.	Names of Charts.	Author.	Size of Sheet, and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	Remarks.
	GULF OF CUTCH, KATTIWAR COAST, &c.— <i>contd.</i>		<i>In. tenths.</i>			<i>£. s. d.</i>	
1	Angenwell Harbour - -	Lieutenant W. E. Rogers	m. = 2 0 $\frac{3}{4}$ D.	1 March - 1828	1826	- 1 -	
1	Laccadive Islands - -	Lieutenant R. Moresby -	d. = 6 0 E.	-- 1 July 1830, corrected to 1845.	1828	- 2 6	
3	Maldeeve Islands - -	-- Commander R. Moresby and Lieutenant F. T. Powell.	d. = 14 5 1 sheet, D. E. 2 sheets, R.	{ Sheet, 1st, 16 April 1838 2d, 10 Dec. 1839 3d, 10 Dec. 1839 }	1835	- 10 -	
1	Maldeeve Islands reduced from the above.	James Horsburgh - -	d. = 2 5 M.	-- First edition, 26 March 1814, corrected to 1841.	1836	- 5 -	- - Second edition.
1	Chagos Archipelago - -	-- Commander R. Moresby and Lieutenant F. T. Powell, I. N.	d. = 12 0 C.	2 December 1839	not stated	- 3 -	
1	Principal groups in the Chagos Archipelago.	The same - - -	m. = 1 0 S. R.	10 July - 1839	not stated	- 2 -	
1	Coast of Tinnevely - -	Mr. J. J. Franklin, R.N.	d. = 30 0 C.	30 April - 1846	1842	- 3 -	
1	Coast of Madura - -	-- Lieutenants Powell and R. Ethersey, I. N., and Mr. Franklin, R. N.	d. = 30 0 C.	30 April - 1846	1838	- 3 -	
1	Western side of Palk's Straits	-- Lieutenants Powell, R. Ethersey, assisted by Acting-lieutenants Jones and W. Christopher, and Messrs. Selby, Heming, Greive and King, Midshipmen.	d. = 30 0 C.	30 April - 1846	1838	- 3 -	
1	Roadstead and Harbour of Tuticorin.	-- Mr. Franklin, R. N., assisted by Messrs. Brookling and Canner.	m. = 4 0 A ^s .	1 July - 1846	not stated	- 3 -	
1	Paumben Pass - - -	-- Lieutenants Powell and Ethersey, assisted by Acting-lieutenant Jones, and Messrs. Macdonald, Christopher, Riddle, Heming, Greive, and King, Midshipmen, I. N.	1,000 yds. = 2 0 Imp.	10 July - 1839	1838	- 2 -	
	BAY OF BENGAL, &c.:						
1	Bay of Bengal - - -	James Horsburgh - -	d. = 1 4 Imp.	1 June - 1825	not stated	- 6 -	
1	Bay of Bengal - - -	James Horsburgh - -	The same - -	-- Second edition, corrected to 1844.	not stated	- 6 -	
1	Pulicat and Armegon Shoals	-- Captain William Maxfield, I. N.	d. = 29 1 A ^s .	25 March - 1822	1821	- 2 -	
1	Mootapilly Bay - - -	Captain Charles Court -	m. = 0 5 R.	1 July - 1830	1816	- 1 6	
3	False Point to Saugor Roads	-- Captain W. Maxfield, I. N., with additions by Commander R. Lloyd, I. N.	d. = 30 0 C.	- 1 December 1819, corrected to 1831.	not stated	- 8 -	- - Second edition.
1	The Sands and Channels forming the entrance into the River Hooghly, including Balasore Roads.	-- Commander R. Lloyd, assisted by Mr. H. Weston, commanding a ^t vessel, and by Messrs. Powers and Keyman, pilot service.	d. = 15 0 E.	1 November 1842	1841	- 3 -	
1	River Hooghly from Calcutta to Saugor Roads.	-- Commander R. Lloyd, assisted by Lieutenant C. Montriou and Mr. Powers.	m. = 1 0 Ant.	1 August - 1839	1836	- 4 6	
3	Sea-face of Soonderbunds -	-- Commander R. Lloyd, assisted by Lieutenants J. A. Young, Boscawen, Montriou, Fell and Rennie, I. N., and Mr. Weston.	d. = 15 0 D.	1 November 1842	not stated	- 6 -	
1	Chittagong or Kornafalee River.	-- By Lieutenants J. A. Young and Rennie, under the direction of Commander Lloyd, I. N.	1,000 yds. = 1 0 M.	1 November 1842	1840	- 1 6	
2	Chittagong to Arracan River	-- Captain Ross, I. N., F.R.S.	d. = 16 0 C.	{ Sheet. 1st, 1 Feb. 1835 2d, 1 May 1835 }	1833	- 3 -	- - Two editions of the second sheet have been published.
1	Coast of Arracan from Akyab to 17° 50' north.	-- Captain D. Ross, I. N., with additions by Commander R. Lloyd, I. N., and Captain Holstead, R. N.	d. = 15 8 C.	- - 1 May 1834, corrected to 1842.	not stated	- 3 -	
1	Arracan River- - -	Lieutenant R. Lloyd, I. N.	m. = 1 0 Imp.	1 February 1834	1832	- 2 -	
1	Cheduba Straits and Coast of Ramree.	Captain D. Ross, I. N. -	d. = 30 9 Imp.	25 May - 1834	1832	- 2 -	First edition.
1	The same - - -	-- Captain D. Ross, I. N., and Captain Holstead, R. N.	The same - -	Corrected to 1842	1832	- 2 -	- - Second edition.
1	A Plan of Kyouk Phyoo Harbour.	Captain Bowman - -	m. = 1 0 $\frac{3}{4}$ D.	20 August - 1829	not stated	- 1 6	

Sheets: Number.	Names of Charts.	Author.	Size of Sheet, and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	Remarks.
	BAY OF BENGAL, &c.— <i>continued.</i>					£. s. d.	
1	Kyook Phyoo Harbour and Combermere Bay.	-- Captain D. Ross and Commander Lloyd, I.N., and Captain Holstead, R.N.	2,000 yds. <i>In. tenths.</i> = 1 0 Imp.	-- 1 October 1833, corrected to 1843.	1832	- 3 -	-- Two editions of this chart.
2	Coast of Ava, from latitude 18° to Cape Negrais.	Captain J. Crawford, I.N.	d. = 30 6 1st sheet, C. 2d sheet, near C.	<i>Sheet.</i> 1st, 1 Dec. 1827 2d, 1 April 1829	1826 & 1827	- 6 -	
1	Eastern Peninsula of India -	James Horsburgh -	d. = 1 0 C.	- 12 Feb. 1813, corrected to 1833.		- - -	-- Second edition.
1	Rangoon River - - -	Captain D. Ross, I.N. -	m. = 1 25 Imp.	1 January - 1827	1825	- 2 -	
1	Plan of Martaban River -	-- Major Jackson, Deputy Quartermaster-general.	d. = 9 5 D.	1 December - 1826	not stated	- 1 6	
1	Moscov Islands - - -	Captain Charles Court, I.N.	d. = 15 0 M.	1 December - 1826	not stated	- 2 -	
	MARTABAN, TENASSERIM COASTS, &c.:						
2	Martaban to Tavoy Point -	-- Captain D. Ross, F.R.S., I.N.	d. = 15 3 R.	<i>Sheet.</i> 1st, 30 July 1829 2d, 1 Aug. 1829	1828	- 4 -	
1	Tavoy River - - -	Lieut. R. Moresby, I.N.	m. = 0 75 R.	1 January - 1827		- 2 -	
1	Tenasserim Coast, from Tavoy Point to Mergui.	-- Captain D. Ross, F.R.S., I.N.	d. = 30 5 C.	16 November 1829	1828	- 3 -	
1	Mergui Harbour - - -	-- Lieutenants J. A. Young and Fell, under the direction of Commander R. Lloyd.	1,000 yds. = 2 0 Imp.	10 July - 1841	not stated	- 2 -	
2	Mergui Archipelago, from Iron Island to the Sayer Islands.	-- Captain D. Ross, F.R.S., I.N.	d. = 14 5 1st sheet, C. 2d sheet, Imp.	<i>Sheet.</i> 1st, 1 Nov. 1832 2d, Feb. 1838	1828 & 1831	{ 3 s. each - 6 -	
2	The same - - -	-- The same, with additions by Commander Lloyd, I.N.	The same - - -	-- The same, with additions to 1839.		- 6 -	-- Second edition.
1	Hastings Harbour, Mergui Archipelago.	Captain D. Ross -	m. = 1 0 S. R.	2 November 1829	1828	- 2 -	
1	General Chart of the River Hooghly, and the Approaches to it.	-- Captain R. Lloyd, I.N., and his assistants.	d. = 12 5 A ^s .	-- 1 January 1840 additions to 1845.	not stated	- 7 -	-- Compiled by J. Walker, Geographer to the East India Company.
1	Moulmein River, and the Eastern Coast of the Gulf of Martaban, from Amherst Point to the Sitang River.	Lieutenant W. Fell, I.N.	-- Scale of plan of River, m = 1 0 Coast, d = 25 2 E.	22 November 1848	1847	- 2 -	
1	Cheduba Roads and Ramree Harbour.	Lieutenant R. Lloyd, I.N.	m. = 0 25 D.			- 1 -	
	STRAITS OF MALACCA, CHINA SEAS, &c. &c.:						
1	Straits of Malacca and Singapore.	James Horsburgh -	d. = 5 0 C.	-- 1 March 1826, additions to 1844.	not stated	- 7 6	-- Second edition.
1	Plan of the Arroa Islands, Straits of Malacca.	Captain D. Ross, I.N., &c.	m. = 1 0 D.	1 August - 1820	1819	- 1 6	
1	North and South Sands, (Straits of Malacca).	-- The same, assisted by Lieutenants Maugham and Crawford.	d. = 14 9 Imp.	1 September 1820	1819	- 2 -	
1	Plan of Singapore Harbour -	Captain D. Ross -	m. = 2 0 $\frac{3}{4}$ D.	1 January - 1820	1819	- 1 2	
1	Singapore Harbour, and Islands in its vicinity.	The same - - -	1,000 yds. = 0 5 M.	1 May - 1830	1827	- 2 -	
1	Plan of the Harbour near Singapore.	The same - - -	1,000 yds. = 2 0 $\frac{3}{4}$ D.	30 May - 1829	1827	- 1 -	
1	Western Coast of Sumatra, with various Plans.	James Horsburgh -	d. = 2 5 C.	10 August - 1832	not stated	- 6 -	Compilation.
1	Northern Pepper Ports (West Coast of Sumatra).	Samuel Ashmore -	d. = 10 2 S. R.	1 October - 1822	1821	- 2 -	
1	East Coast of Sumatra, from Diamond Point to the southern entrance of Brewer's Straits.	-- Lieutenants W. Rose and R. Moresby, I.N.	d. = 10 0 A ^s .	1 January - 1824	1822	- 3 -	
1	Islands eastward of Bintang	Captain D. Ross, I.N. -	d. = 15 0 $\frac{3}{4}$ D.	1 August - 1820	1819	- 1 -	
1	East Coast of the Malay Peninsula.	-- Lieutenant John Crawford, I.N.	d. = 4 0 $\frac{3}{4}$ D.	1821	1820	- 1 -	
1	Straits of Durian - - -	-- Lieutenants W. S. Collinson, Hawkins, and R. Moresby, I.N.	m. = 0 75 Imp.	1 November 1823	1822	- 2 -	
2	Tanjong Bon and Pulo Borellah, to the southern entrance to the Straits of Durian.	-- Lieutenants Collinson and R. Moresby.	d. = 22 8 S. R.	not stated	1823	- 4 -	
1	Ilchester Shoal - - -	Captain D. Ross -	d. = 11 5 $\frac{1}{2}$ D.	14 September 1820	1819	- 1 -	
1	Tracks of the H. C. S. "General Harris," on her passage from China to Gaspar Straits.	No name - - -	d. = 7 8 D.	2 January - 1826	1825	- 1 6	

Sheets: Number.	Names of Charts.	Author.	Size of Sheet and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	Remarks.
	STRAITS OF MALACCA, CHINA SEAS, &c. &c.— <i>cont^d</i> .		<i>In. tenths.</i>			<i>£. s. d.</i>	
1	Island of Thwart-the-way, with the Passages between that Island and Hog Point, and the Button and Cap Rocks.	-- Captain Maxfield and Lieut. J. S. Criddle, I.N.	m. = 0 5 D.	1 November 1820	1819	- 1 6	
1	Track of the H.C.S. "Scaleby Castle" through the Gillolo Passage.	-- Mr. W. R. Blakely, chief officer.	d. = 9 8 R.	1 February - 1823	not stated	- 2 -	
2	China Seas - - -	James Horsburgh - -	d. = 2 0 D. E.	<i>Sheet.</i> 1st, 1 Oct. 1821 additions to 1844 2d, 1 July 1831	not stated	- 15 -	- Two editions published.
1	Passages leading the Lymoon	-- W. R. Blakely, assisted by John Vaux, Charles Evans, and Charles W. White, H. C. S.	m. = 1 0 $\frac{3}{4}$ D.				
1	Canton River - - -	James Horsburgh - -	d. = 25 6 A°.	1 July - 1831	not stated	- 7 6	
1	South-east Coast of Hainan -	Captain D. Ross - -	d. = 14 0 D.	1 June - 1822	not stated	- 1 6	
1	Lintin to the Bocca Tigris -	Lieutenant D. Ross - -	m. = 1 0 $\frac{3}{4}$ D.	not stated	not stated	- 2 -	
1	The Dhaulie's Track, between the east coast of China and western part of Formosa.	Mr. George Baxland -	d. = 5 5 Imp.	18 August - 1828	1827	- 2 -	
1	Plan of the Soundings on the S.E. Coast of China.	Lieutenant Parkyns, R.N.	d. = 20 0 $\frac{3}{4}$ D.	10 June - 1825	1824	- 1 -	
1	Killon Harbour and Merope Bay, in the Island of Formosa.	-- Lieutenant G. Parkyns, R. N., and Mr. J. B. Livesay.	m. = 13 0 R.	1 July - 1825	1824	- 2 -	
1	East Coast of China - -	James Horsburgh - -	d. = 2 9 D. E.	12 February 1835	not stated	- 8 6	
3	Eastern Passages to China -	The same - - -	d. = 2 0 C.	<i>Sheet.</i> 1st, 1 May 1824 2d, 2 June 1828 3d, 2 Jan. 1826; sheet 1st, corrected to 1845; 2d, corrected to 1839.	not stated	1 11 6	
1	Islands and Channels at the S. W. extremity of the China Seas.	James Horsburgh - -	d. = 11 2 C.				
1	Passages through the Barrier Reefs, &c. &c.	The same - - -	d. = 15 0 $\frac{3}{4}$ D.	28 January - 1830	not stated	- 4 -	
1	Plan of the Channel to the eastward of Fansyack.	-- W. R. Blakely, John Vaux, Charles Evans, and Charles W. White, E.I.C. maritime service.	m. = 1 0 $\frac{3}{4}$ D.	1 November 1830	1829	- 1 -	
INDIAN OCEAN:							
1	Madagascar Archipelago -	-- Captain T. Moresby, C.B., R.N.	d. = 6 0 C.	20 May - 1824	1822	- 2 -	
1	Indian Ocean, from Kerguelen's Island to the Saya de Malha Bank.	James Horsburgh - -	d. = 0 5 A°.	- - 10 Nov. 1814, additions to 1833.	not stated	- 7 6	- - Second edition.

SAILING DIRECTIONS.

Vols.: Number.	TITLE OF BOOK.	AUTHOR.	Date of Publication, and Price.
1	Sailing Directions for the Red Sea.	-- Commanders Moresby and Elwon, I.N.	London, 1831 - 3s.
1	Nautical Directions for the Maldiva Islands and the Chagos Archipelago.	-- Commander R. Moresby, I. N.	London, 1840 - 2s.

(True copy.)

(signed) *P. M. Melvill*, Lieutenant-Colonel,
Secretary to Government.

LIST OF CHARTS, &c.—*continued.*

Sheets : Number.	Names of Charts.	Author.	Size of Sheet, and Scale of Chart.	Date of Publication.	Date of Execution.	Price.	Remarks.
						£. s. d.	
1	Moulmein River and Eastern Coast of the Gulf of Martaban.	Lieutenant Fell	-- 32 by 27 inches ; 5 miles = $2\frac{1}{10}$ inches.	22 November 1848	1847	- 2 -	
1	Islands of Rameseram and Manaar.	-- Lieutenants Powell and Ethersey.	-- 40 by 26 inches ; 1 mile = $\frac{1}{2}$ inch.	20 February - 1850	not dated	- 3 -	
4	West Coast of Ceylon	-- Mr. J. J. Franklin, R.N., and Lieutenants Powell and Ethersey, I.N.	-- 26 by 20 inches ; 1 mile = $\frac{1}{2}$ inch.	20 February - 1850	1845	- 1 6 each sheet	
1	Calicut Roads, and Entrance to Beypoor River.	-- Lieutenant Montrieu and Mr. A. D. Taylor.	-- 24 by 23 inches ; 1,000 yards = 1 inch.	25 February - 1850	1846	- 1 6	
1	Vizidroog, or Gheriah Harbour.	-- Lieutenant Montrieu and Mr. A. D. Taylor.	-- 22 by 21 inches ; 500 yards = 1 inch.	1 March - 1850	1844	- 1 6	
1	Cochin Harbour and Roads	-- Lieutenant Robinson and assistants.	-- 22 by 13 inches ; 1 mile = 4 inches.	22 April - 1850	1835	- 1 -	
1	Entrance to the Red Sea	Commander Haines	-- 40 by 26 inches ; 1 mile = 1 inch.	2 May - 1850	1835	- 3 -	
1	Dewghur Harbour	-- Lieutenant Montrieu and Mr. A. D. Taylor.	-- 33 by 26 inches ; 250 yards = 1 inch.	20 May - 1850	1844	- 2 -	
1	Islands westward of Socotra	-- Lieutenant Grieve and Mr. Ward.	-- 40 by 26 inches ; 4 miles = inch.	25 May - 1850	1848	- 3 -	
1	South-east Coast of Arabia, sheet II.	-- Commanders Haines and Sanders, and Lieutenant Grieve.	-- 40 by 26 inches ; $1^2 = 6\frac{2}{10}$ inches.	1 August - 1850	not dated	- 3 -	
1	Anchorage of Rutnagheriah	-- Lieutenant Montrieu and Mr. A. D. Taylor.	-- 26 by 20 inches ; 500 yards = 1 inch.	1 January - 1851	not dated	- 1 6	
1	Bay and entrance of Rajapoor River.	-- Lieutenant Montrieu and Mr. A. D. Taylor.	-- 31 by 26 inches ; 250 yards = 1 inch.	1 January - 1851	1844	—	
1	Coringa Bay	Lieutenant Fell	-- 24 by 24 inches ; 1,000 yards = 1 inch.	-- now in course of engraving.	1846	—	
3	Coromandel Coast	Lieutenant Fell	-- 40 by 26 inches, and 32 by 26 inches ; 4 miles = 1 inch.	-- now in course of engraving.	1848	—	
1	North-east Coast of Africa	-- Lieutenants Barker and Grieve.	-- 40 by 26 inches ; $1^2 = 6\frac{2}{10}$ inches.	-- now in course of engraving.	1847	—	

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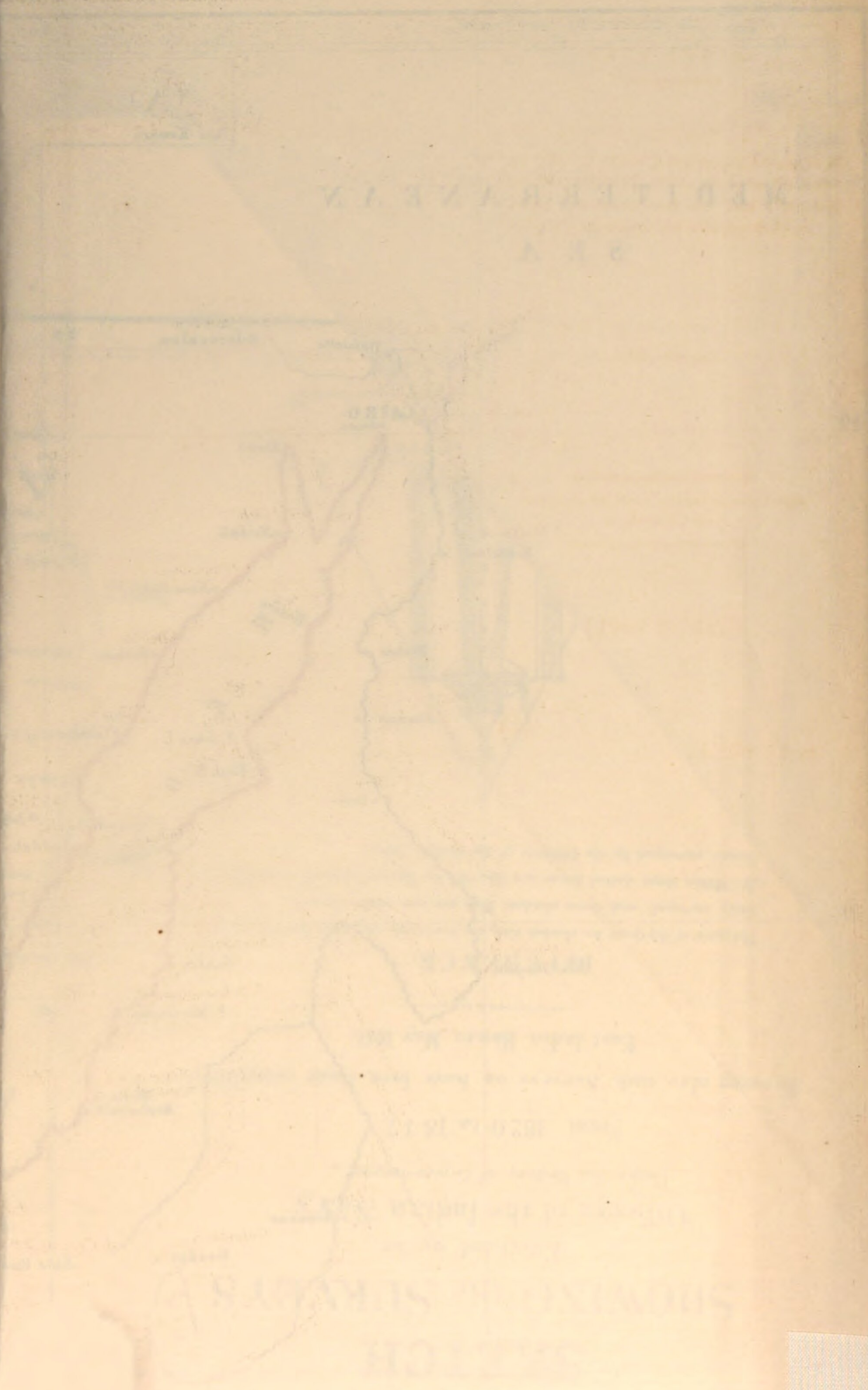
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